

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

June 21, 1972

Vol. VI No. 25

CW SAMPLE COPY
MI48106UIVYMFCWB FC
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWS IN BRIEF

Gov. Reagan Gets Software Bill Again

SACRAMENTO, Calif. — Governor Ronald Reagan is expected to sign a bill soon that would exempt computer property applications programs from local taxes.

The bill finally passed by the California legislature exempts all programs except basic operating systems from property taxes for at least two years.

Presently only Orange County taxes programs but Los Angeles County had indicated its intention in assessing programs in 1972-73. And other counties were looking into such a tax.

Several members of the legislature indicated that the potential annual loss in county property tax revenues could reach \$45 million a year. That figure is based on the state board of equalization estimate that computer programs now in use in the state have a value of \$1.5 billion.

The bill would still allow counties to tax operating systems, which are generally included in the purchase price of the computer system.

Tax Evaders Face Triple Pronged Computer Attack

TOLEDO, Ohio — City officials have crossed state lines to trace residents who may be working in Michigan, and thereby avoiding a city payroll-income tax of 1.5%.

After copying some 250 Ohio license plates from cars in the parking lots of Michigan schools, the officials used the police department computer to identify the owners.

The next step, according to local sources, will be to compare the list with two others: 1971 Internal Revenue computer tapes of residents who paid income taxes, and local taxpayer "accounts."

Individuals residing here but not paying the city payroll taxes will be penalized according to the law, which permits 6% interest and 10% penalty charges to be imposed, sources indicated.

Under new tax laws passed by Michigan and Ohio, non-resident employees pay income tax only in their home states.

On the Inside This Week

OCR Users Meet: Use Requires
'Conscientious Effort' — Page 3

Manager Hails 'More Effective'

Small Computer Systems — Page 16

Communications13

Computer Industry23

Editorial8

Financial26

Professional Viewpoint10

Small Systems User16

Software/Services11

Systems/Peripherals17



(Ann Arbor News Photo by Cecil Lockhard)

Paper Tape User

This modern mother has an eye for DP. She picked used computer tape to help construct her nest.

'Archaic Courtrooms' Need More DP to Deter Crime

By Edward J. Bride
Of the CW Staff

WASHINGTON, D.C. — The failure of criminal courts to take full advantage of computer technology is partly to blame for the breakdown of the criminal justice system, and for the weakened "deterrent effect" of criminal laws, Senate sources claim.

In introducing the Criminal Justice Reform Act of 1972, Sen. Henry Jackson supported his legislation with two reports, one criticizing the past record of computer use in the courts and the other recommending remedies.

Jackson said reform is "not just a question of more prosecutors, more defense counsel, or more judges."

"It is a matter of instituting new management techniques to control criminal dockets. It is a matter of changing archaic courtroom and appeals procedures that shackle our criminal courts," he said.

Jackson referred to recommendations of the American Bar Association (ABA) special committee on crime prevention and control, which proposed computer use in three of its 20 ideas.

"Computers should be utilized," the ABA committee said, "to assist the court" in scheduling, routine paperwork, avoiding conflicts, "and providing various types of judicial statistics needed for effective court operation and planning."

The committee also proposed "technological alternatives" to manual preparation of transcripts, specifically "computer-aided production, sound recording and video-taping."

These procedures should be "explored thoroughly and, where feasible . . . introduced on a widespread basis," the committee added.

In its final recommendation, the committee said "intensive statistical research" must be carried out "to discover precisely where and why cases are being backed up in the judicial process."

"The current lack of such elementary data" makes close analysis of court prob-

lems "extremely difficult," the report concluded.

'Breakdown of System'

In introducing the bill, S3669, Jackson said it was "hard to avoid concluding" that the "breakdown of the criminal justice system" had a "direct impact" on the "deterrent effect of our criminal justice laws."

Part of the problem comes from "the inevitable hostility to change in any large bureaucracy," according to the other re-

(Continued on Page 2)

But at Slower Rate

Systems Jobs Salaries Up

By a CW Staff Writer

CLEVELAND, Ohio — Salaries for systems people are still going up, but at a much slower rate than at the turn of the decade.

The median salary of analysts, senior analysts, and managers reached \$16,739 in 1971, according to figures just released by the Association for Systems Management, which has over 10,000 members.

ASM noted this figure amounts to an annual increase of 4.2% since its last salary study in 1969 when the median salary was \$15,435. From 1965 to 1969 the annual increase was 7.3% from an \$11,946 base, ASM reported.

Coinciding with salary increases is the trend in experience. Fifty-five percent of the respondents claimed over 10 years of systems experience in the current study, ASM noted. This figure was 49% two years ago, and 40% when the first study was undertaken in 1955.

This "upward trend" was expected, ASM said, since "the need for systems personnel has largely manifested itself since World War II."

The figures are contained in a new report entitled "Profile of a Systems

Man," which is available for \$5 from the association's headquarters, 24587 Bagley Road, 44138.

By job title, 66% of the respondents were classified as analyst, senior analyst, or manager. For the most part, they supervised such people as systems and/or DP analysts, programmers, machine operators, and keypunch operators.

The report did not contain salary breakdowns by job title.

"A decided movement toward the upper salary limits" in the survey "is becoming increasingly apparent" with each ASM appraisal, the report said.

While based on ASM members only, it is highly probable that the trends noted are "representative of the systems profession," the report said.

Two questionnaires were sent out to the group's 10,000 members, one which asked about "confidential" personal data, and the other requesting company information.

Almost half the members, or 5,097, replied to the personal questions, while 3,814 replies were received to the company data questionnaire.

(Continued on Page 2)

More DP Needed to Deter Crime

(Continued from Page 1)

port submitted by Jackson.

Prof. James Vorenberg, a former executive director of the President's Commission on Law Enforcement and the Administration of Justice, concluded that the court system "appears to have deteriorated" in the past five years, Jackson commented.

Jackson introduced an article from the May issue of *Atlantic*, in which Vorenberg said much federal aid "has gone for such flashy items as helicopters, computerized communications systems, and new weaponry. Yet these have not produced a significant impact on crime."

Proposals to substitute halfway houses for high-security prisons, "and computers for court docket clerks... threaten job security and challenge the propriety and worth of what is being done," Vorenberg contended.

"Much of the answer lies in the inevitable hostility to change in any large

bureaucracy," he said.

The article was also critical of the "block grant" system of federal aid, claiming "with block grants the federal government cannot directly push for reform."

"It simply gives a lump sum to each state to be distributed in accordance with the state's own written plan."

The Law Enforcement Assistance Administration (LEAA) is one federal agency which provides such block grants to help fight crime, and one recipient has been Project Search, which conducts research into computerized criminal systems.

New Use for 'Search' Report?

Project Search officials have recently compiled guidelines for states to use in setting up these retrieval systems, with the goals of providing for speedy trials and protecting privacy.

These guidelines may be of special assistance to states under Jackson's bill, since states and local governments "would not be eligible for LEAA grants" unless they had a "prompt trial plan approved by the LEAA."

"Continuing eligibility would depend on progress toward the prompt trial objective."

Justice's Computers Inadequate?

WASHINGTON, D.C. — The inability of a Department of Justice information system to provide data on the enforcement of laws has come under attack by Senate Majority Leader Mike Mansfield.

Two years ago, Mansfield successfully proposed mandatory sentencing for convictions of "mere possession of a weapon" in committing a crime.

"Out of a congressional responsibility to review all laws," he attempted last March to "determine how the tool provided by this proposal was working in the fight against crime and violence."

Mansfield sent then Acting Attorney General Richard G. Kleindienst a request for data on "the courts' compliance with these sentencing procedures, including the number of first and subsequent offenders sentenced thereunder, terms of sentences, courts involved," and other information.

Assistant Attorney General Henry E. Petersen responded that the "statistical data you requested could not be retrieved..."

"We are informed, however, that the Department of Justice information system is under alteration and that information such as you requested will be available" when the modifications have been completed," Petersen promised.

Addressing his Senate colleagues recently, Mansfield said, "in this era of sophisticated computer systems, it is inconceivable that crime, criminal penalties, criminal justice, and all such related matters cannot be adequately monitored."

While the crime rate "continues to soar," Mansfield continued, "the U.S. Senate is unable to be informed adequately" about "fundamental information concerning the enforcement of 2-year-old laws — designed expressly to curtail that rate of crime."

The bill, an amendment to the Omnibus Crime Control and Safe Streets Act of 1968, would authorize \$750 million over the next three years, for grants for criminal justice reform.

"I am convinced that we must commit new federal resources if we are to make

real progress toward rehabilitating our criminal courts," Jackson said.

The bill was referred to the Committee on the Judiciary for investigation and recommendations, and a spokesman for Jackson said there was "no way" to know when a report might be forthcoming.



TM Reg. U.S. Pat. Off.

ROBERT M. PATTERSON, executive editor. V.J. FARMER, news editor. RONALD A. FRANK, technical news editor. E. DRAKE LUNDELL JR., computer industry editor. DONALD LEAVITT, software editor. EDWARD BRIDE, JUDITH KRAMER, FRANK PIASTA, MARY UPTON, staff writers. MARVIN ARONSON, LESLIE FLANAGAN, copy editors. PATRICIA M. GAUVREAU, editorial assistant.

J.H. BONNETT, European bureau.

NEAL WILDER, national sales manager; DOROTHY TRAVIS, sales administrator; FRANCES BLACKLER, market research.

LEETE DOTY, production manager; HENRY FLING, production supervisor.

EDITORIAL OFFICES: 797 Washington St., Newton, Mass. 02160 (617-332-5606; TWX 710-335-6635). Europe: Computerworld, c/o IDC Europa Ltd., 59 Grays Inn Rd., London, W.C.1, England (01-242-8908).

Second-class postage paid at Boston, Mass. and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington Street, Newton, Mass. 02160. © 1972 by Computerworld, Inc.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to publication manager.

25 cents a copy; \$9 a year in U.S.; \$10 a year in Canada; Airmail to Western Europe and Japan, \$15 a year. Other foreign rates on request. MARGARET PHELAN, circulation manager. Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160.

W. WALTER BOYD, publication manager. PATRICK J. MCGOVERN, publisher. qa



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.

Systems Jobs Salaries Not Climbing as Fast

(Continued from Page 1)

On the company questionnaire, the typical unit was a small one. Over one-fourth of the responding companies had fewer than 10 people in the systems and DP unit, and two-thirds of the companies had fewer than 50 people there.

DP Budgets

Even so, about one fifth of the respondents showed an equipment budget of "over \$75,000" — the highest range listed in the questionnaire, while other respondents checked lower categories up to \$50,000 were about evenly distributed.

What may appear to be a disparity appears in the figures for the average age of respondents, which is getting lower. For example, there is more than a 50% increase in respondents under 29, from 14% two years ago to 22% in the current study.

While respondents aged 30 to 39 are down just slightly, those aged 40 to 49 and 50 to 59 are both down significantly.

According to ASM, this suggests that organizations "may have recognized the system generalist's integrative talents as being of greater value higher up the organizational structure."

Today's systems managers, the report claimed, are "candidates for executive positions" because their training and

skills bring a most needed quality to the executive ranks.

"Future executive candidates will be

trained in systems principles and concepts to become generalists in management systems," the report said.

Gal Engineers Set Computer Meet

CAMBRIDGE, Mass. — Are they for us or against? Are they a tremendous boon to mankind or are they monsters insidiously encroaching into every nook and cranny of our day-to-day life?

Computers are here to stay and the answers to these questions will be explored in the technical sessions of the Society of Women Engineers' 22nd national convention being held at the Sheraton Commander June 22-25.

The theme, "The Impact of the Computer on the Society of Today," sets the scope of the exploration and the most important phase of the impact is pointed up by the keynote speech, "The Challenge of the Computers" to be given by Commander Grace Hopper, USNR, Head, Navy Program Languages.

Sessions will include: "Computer Design and the Challenge to Engineering," "The Computer Industry & the Future," and presentations of papers on the impact of computers on the insurance business, banks, merchandise warehousing, libraries, hospitals, industry, air traffic control and lotteries.

Mrs. Margaret Linda, 301 Park St., West Roxbury, Mass. is the convention registrar.

Study on Use of Computers In Blood Banks Available

BETHESDA, Md. — The National Blood Resource Program has released a synopsis of the results of four studies on the adaptation of computer systems to blood banking processes.

These studies were carried out in New York, Chicago, Buffalo and Milwaukee with the support of the National Heart and Lung Institute.

They include:

- A critique of blood bank services which can be managed by computer
- General suggestions of proper hardware and estimates of cost-effectiveness
- Guidelines to use in evaluating your blood bank for computer services.

For your copy, write to: James M. Stengle, M.D., Chief, National Blood Resource Program, NIH, Bethesda, Maryland, 20014, Attn: Feasibility Study.

ATTACH LABEL HERE for address change or inquiry. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels. Please let us know four weeks before you plan to move. List new address below and include a current mailing label or your old address.

☐ 1 year — \$9*

*10 a year in Canada; Airmail to Western Europe and Japan, \$15 a year; Other foreign rates on request.

☐ Charge My American Express Account:

--	--	--	--	--	--	--	--	--	--

☐ New subscription

If charge we must have cardholder's signature: ☐ Change of address

First Initial	Middle Initial	Surname										
Your Title		CW-72-03										
Company Name												
Send to: Address												
City										State	Zip Code	

Address shown is: ☐ Business ☐ Home ☐ Check here if you do not want to receive promotional mail from *Computerworld*.

COMPUTERWORLD Circulation Department
797 Washington St., Newton, Mass. 02160

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

YOUR INDUSTRY

- 01 Mining/Construction/Oil & Refin.
- 02 Manufacturing — Computer or data system hardware/peripherals/other associated mechanical devices
- 03 Manufacturing (other)
- 04 Utilities/Comm Sys/Transport
- 05 Wholesale/Retail
- 06 Finance/Insurance/Real Estate
- 07 DP Serv. Bureaus/Software/Plann.
- 08 Business Services (except DP)
- 09 Education/Medical/Legal
- 10 Federal, State and Local Govt.
- 12 Communications/Printing/Publ.
- 13 Other:

YOUR FUNCTION

- 01 Corporate Officer
- 02 Data Processing & other Operational Mgmt
- 03 Data Processing Professional Staff
- 04 Consultant
- 05 Lawyer/Accountant
- 06 Engineering-Management/Scientific/R&D
- 07 Sales/Marketing/Account Exec.
- 08 Librarian/Educator/Student
- 09 Other:

User Association Hits Problems

OCR Use Requires 'Concentrated, Constructive Effort'

By E. Drake Lundell Jr.
Of the CW Staff

PARK CITY, Utah — Optical character recognition is a viable and useful tool for data entry, but ways must be found to extend its usefulness to a wider audience.

That is the consensus of a recent OCR User's Association meeting which was attended by almost 100 OCR users and equipment manufacturers here recently.

The meeting was also the scene of an exchange of views on the problems that plague current OCR installations, with discussions covering reject handling, reading carbon forms, etc.

"The optical scanner can function in an uncontrolled environment, with a high degree of accuracy," Roy Rapp of the Social Security Administration told the group, but it requires "concentrated and constructive effort."

"Future applications of the device," he added, "are unlimited. Its use will become more universal as the most common problems are overcome and technical advances made which, not only improve its present reading capabilities, but also create a flexibility undreamed of in our present environment."

One major problem with accepting documents either typed or handwritten from an uncontrolled environment today, Rapp said, is that the people preparing the documents are often untrained for the work.

To alleviate this problem and to spread the use of OCR into more areas, he suggested that training programs should be initiated in the high schools and commercial schools.

"Present typing text books contain instructions for typing letters, memorandums, manuscripts, tabulated data and statistical tables. Instructions for preparing scannable forms could be incorporated in these text books and would be very helpful to all OCR users," he asserted.

In addition, he asked: "What better approach could we use than to teach OCR-A handprint format in the lower grades?"

"This," he stated, "could eventually become the universal handprint style. Such an educational system would be instrumental in opening the door for many more applications of scanning, and would permit a faster response to many mail orders and other miscellaneous matters."

Problems Discussed

Documents rejected for errors and how to recapture the data was the major topic at a forum in which users discussed problem areas and received help both from other users who had overcome similar problems and from manufacturers representatives who had experience with similar matters.

The users used almost every method imaginable to recapture data lost because a document was rejected, ranging from keypunches through key-to-disk systems to direct on-line entry with no one technique apparently having the upper hand.

However, the problems of correcting documents has to be handled carefully, the users agreed.

In some cases, one said, user departments don't like to have the errors corrected in the computer room, because the computer room personnel, unfamiliar with the original situation, might make a more serious mistake than the one they were trying to correct.

In cases like this, they agreed, it is best to send the rejected documents back to the originating department for all corrections.

It is not only important to train the people who will be preparing documents for later OCR input carefully, one user said, but it is also important to keep monitoring their performance to make sure they perform at the maximum efficiency.

To do this, he said his installation kept a

record of all rejected documents by user department so that they could send performance reports to those departments on a regular basis. When the performance was starting to slip, the user department would be responsible for finding the cause — either in its machinery or personnel — and correcting it.

He noted that the firm had tried an experiment by not sending out the periodic reports and "the error rate shot up dramatically."

Another user agreed, noting that his organization had been able to get "10-fold increase in quality" after it initiated a program to provide continual feedback to the inputter and continually monitor the quality of the forms coming in for scanning.

Hardware Controls

In the area of hardware performance controls, the group agreed it is necessary to keep careful internal track of maintenance

records in order to find any degradations in the performance of the systems.

In order to discover any degradation, one user suggested running a test deck before each shift the OCR equipment was placed in operation. If there is any increase in the error rate from one shift to the next or one day to the next, then it is easy to tell there is some problem with the equipment, he suggested.

Ralph Brouwer, executive secretary for the association, noted that he reports to the customer engineer servicing the equipment on a daily basis on possible problem areas found by an analysis of every reject found in the operation of the system.

Another user, however, suggested that OCR users need not analyze every rejected document to find problems in both personnel or equipment.

"The OCR user," he said, "should set acceptable parameters for rejected documents. If the reject rate runs over that

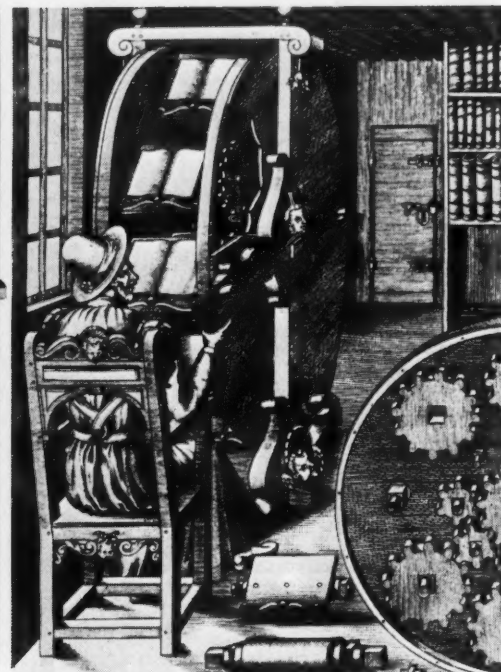
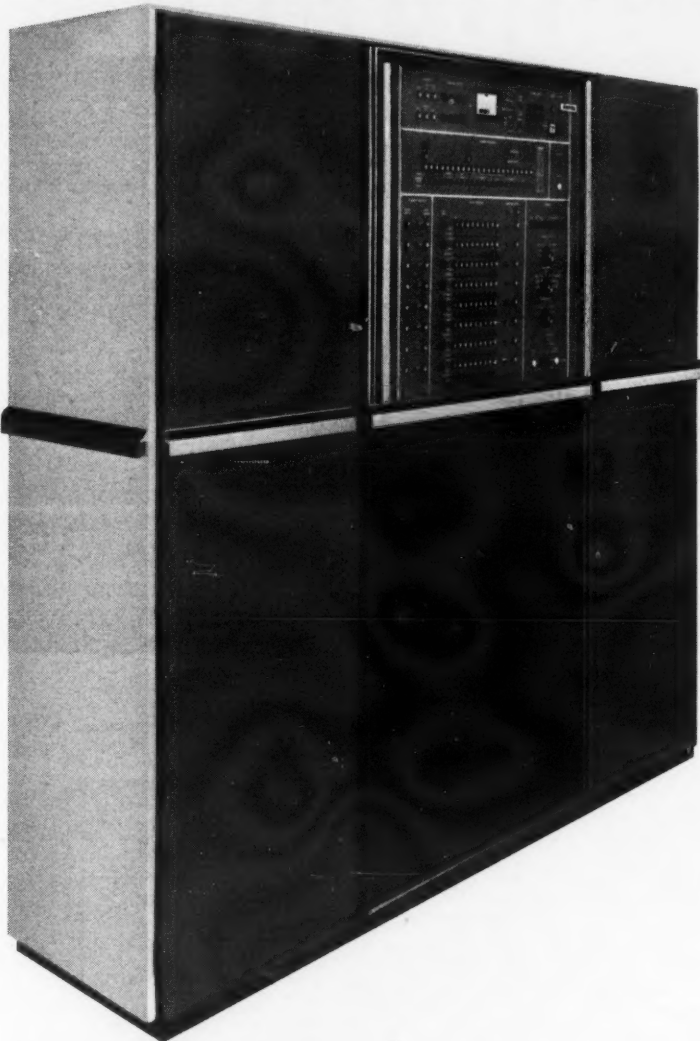
level, he added, "then the user can analyze the data for the source of the problems."

It is almost impossible to pool a number of small jobs into one OCR run, the users agreed, because of difficulties in developing software to handle the number of small applications.

In another area, several users warned that the OCR-A font on the Selectric typewriter from IBM differed "significantly" from the OCR-A font on the 1403 print train and that the two couldn't be intermixed when using a single font reader.

The B, D, one, I, 8, 0 and zero are different and could cause problems one user asserted. However, another user reported that it was possible to get a Selectric ball with a font that matched that of the 1403 print train, but that it had to be specially ordered and many IBM salesmen were not familiar with it.

Get your 360 to work harder. Enhance its memory power.



**Before you think about a 370,
think about Ampex memory enhancement.**

More memory means more resident programs, simpler programs, larger buffer allocations, increased efficiency ... and even new computer applications.

And Ampex ARM Mainframe and ECM Extended Core Memories can make an IBM 360 outperform a 370. ARM doubles or triples mainframe memory; ECM adds core in 1 megabyte increments at high speeds.

Memory to get more out of your computer. Use ARM to double or triple your memory capacity, get more done with your present computer. For example, ARM-22 can expand the 360/22 to 64K; ARM-30 can expand the 360/30 to 128K, and ARM-40 can expand the 360/40 to 512K. The ARM-50 works to one and one half million bytes. Economical, too, on purchase or lease.

ECM provides 1.8 usec cycle time for IBM Models 65, 67 and 75, even faster with interleaving. ECM for Model 50 operates at 2.5 usec. Available in 1 to 8 million bytes to expand memory with no software changes.

Worldwide service, too. For information on ARM, ECM, as well as tape drives and disk drives ... call your local Ampex computer expert. Or write.

AMPEX

AMPEX COMPUTER PRODUCTS DIVISION
13031 West Jefferson Boulevard
Marina del Rey, CA 90291. (213) 821-8933

DP Study May Nix Diet Drugs

WASHINGTON, D.C. — The Food and Drug Administration is currently evaluating results of a computer study on the use of amphetamines and other anti-obesity drugs for weight reduction.

The \$40,000 pilot project was undertaken to determine "once and for all whether these drugs are safe and effective" in light of their widespread abuse.

"It will provide the most important facts," said an attorney for the Bureau of Narcotics and Dangerous Drugs who will use the results of the study to set amphetamine production quotas for next year.

The computer scanned 70,000 punched cards with information about 1,200 patients from 210 different studies in an effort to determine such factors as weight loss attributed to drugs, how close it was to target, how long the pounds stayed off and the number of dropouts.

Dr. Barrett Scoville, deputy director of the Food and Drug Administration's Division of Neuropharmacological Drug Products said the computer was the "only feasible way of setting policy in a broad fashion implicitly rather than one drug at a time."

The results of the study and the government's decision regarding drug production are expected to be complete in early July.

Time Runs Out on British Data Bank Bill

LONDON — A bill that would set up a tribunal to regulate the operation of data banks in Britain was essentially killed during a recent debate in the Commons. The provisions of the bill were still being discussed when the statutory time limit was reached and now there appears no chance of the bill becoming law during this session of parliament.

Leslie Huckfield, the bill's sponsor, urged the government to accept his proposals, claiming that

taking any steps to safeguard information in data banks.

Welfare Recipients Receive \$80,000 in Duplicate Checks

DETROIT — A computer in the state's Department of Social Services recently sent out \$80,000 in duplicate checks to welfare clients throughout the state.

According to Gerrold Brockmyre, assistant deputy director of the state agency, the duplicate checks resulted when the same batch of supplemental emergency payments was fed into the computer on two separate days. The error was discovered when merchants who were asked to cash two checks grew suspicious.

Many of the 887 twice-paid recipients are cashing the second check under the mistaken impression that they are entitled to the money, but some clients "are sending the extra checks back," said Brockmyre.

"Those who have spent the money have received a rather strong letter suggesting they make an arrangement to repay the money," he added.

News Wrapup

"in Britain today so many people were gathering information on individuals that personal liberty, privacy and freedom were very much endangered." The situation has been made a more severe problem by the computer, which enables integration of various categories of information, he claims.

Government officials said they are waiting for a report from the Younger Committee, established to investigate the issue of privacy in Britain, before

Bankettes Provide 24-hour Automated Banking Service

MONTREAL — A 24-hour computerized banking service that can handle about 98% of ordinary transactions carried out by an individual is being planned by the Royal Bank of Canada.

The "Bankettes" will be installed in 14 locations in metropolitan Toronto and may be expanded to other locations. The units will take deposits, transfer money from one account to another, pay bills and dispense cash to the customer.

Royal is expected to be the first Canadian bank to provide complete 24-hour service.

Sewer Overflow Controlled

CLEVELAND, Ohio — Overflow waste water in the city's sewer system will soon be controlled by a computer in an effort to reduce pollution of Lake Erie and local streams.

Overflows of storm water and raw sewage occur during wet weather when the volume of waste water becomes too large for the system to handle. With the new system, gauges will measure the water level in the sewers and the rainfall outside.

This information will go to a central computer via telephone lines. If it is determined that the flow is too heavy, "minidams" in the sewers will automatically be inflated to temporarily store the extra waste and water.

In addition to controlling sewerage flow, the system will be used to test out — via simulation techniques — other pollution control ideas.

Oil Spillage Minimized

ANCHORAGE, Alaska — A \$20 million microwave communications system has been designed to minimize oil spillage along the 789-mile route of the proposed trans-Alaska pipeline.

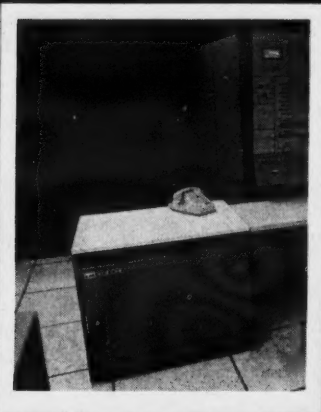
The computerized monitoring system would update pipeline conditions every 10 seconds, alert central control to any unusual changes and pinpoint the exact location of the potential trouble spot.

As an added precaution, if the computer detects problems in the two critical junctures of the pipeline, all 12 pipelines can be shut down.

Real Estate Goes Modern

HAWKPIKE HILLS, N.H. — For sale: one modern ranch house with three bedrooms, formal dining room — plus a computer terminal.

Derrick Johnston, a GE employee, is selling his home here and the buyer, *Yankee Magazine*, insisted that the terminal, presently installed in the Johnston home, be included with the house. The magazine, publisher of the *Old Farmer's Almanac*, plans to use the terminal, now tied to the Dartmouth Time Sharing System, for aid in weather prediction.



360/CORE

IS WINNING ALL THE BIG ONES!!!

THE COMPACT FROM CMI SAVES YOU MORE THAN ANY OTHER 360 COMPATIBLE CORE!!!



CAMBRIDGE MEMORIES INC.

WINNER: ARMY BASOPS-360/CORE 37 MODEL 30'S, 16-128K BYTES.

WINNER: NAVY AWARD-360/CORE 8 360'S MODELS 30, 40 & 50.

WINNER: RANDOLPH, DPF, DIEBOLD, EDPR & GROWING MULTITUDE OF USERS.

360 COMPATIBLE-PLUS

Fully 360 compatible — PLUS upward/downward — model to model — COMPATIBILITY. This saves in installation time, spare parts, inventory and service.

THE COMPACT 360/CORE

Our desk-high unit packs 128K bytes plus "bump" (auxiliary) store in a single cabinet only 30" high — and it's available for all models — 22, 30, 40, and 50!! This takes less floor space — and the operators like that precious counter space. It all adds up to more savings with CMI.

NATIONWIDE MAINTENANCE

We've contracted with COMMA & HONEYWELL — then backed this with our own 360/CORE specialists to assure you of the best qualified, most prompt maintenance available.

CAMBRIDGE, TODAY'S LEADER IN ADVANCED TECHNOLOGY FOR DATA STORAGE

We are a young company, but not a new one. We've been around long enough to establish quite a track record in advancing the art of data storage through the innovative application of sound advanced technology. Examples include EXPANDA-

CORE, the first small field-expandable OEM core memory, UNICORE, a single card memory for desk calculators, the FIRST MOS semi-conductor buffer and now a new proprietary technology — DOMAIN TIP — or DOT. DOT is a fast highly reliable BATCH fabricated technology which promises even larger, more economical memories. Our 360/CORE brings to bear all this expertise for your benefit.

COMPACT 360/CORE LINE

EXPAND or REPLACE MEMORY on your rented, leased, or owned 360 system.

CC22 360/22 to 64K bytes
CC30 360/30 to 128K bytes
CC40 360/40 to 448K bytes
CC50 360/50 to 1024K bytes

We're here to serve you and welcome your inquiries. Write Dick Baker, Director, End User Marketing, or contact our nearest sales office:

Boston (617-969-0050)	New York (212-868-4936)
Dallas (214-233-0452)	Minneapolis (612-890-6810)
Chicago (312-425-4544)	Philadelphia (609-227-2203)
Hartford (203-247-4500)	San Francisco (415-692-4806)
D.C. Metropolitan Area (301-657-9105/6)	
North New Jersey (201-947-0184)	
Rochester, N.Y. (716-244-1430)	



CAMBRIDGE MEMORIES, INC.

285 Newtonville Ave., Newton, Mass. 02160
Telephone 617-969-0050, Telex 92-2405

— today's leader in advanced technology for data storage —
UNICORE • EXPANDACORE • MOS BUFFERS • 360/CORE • DOT DOMAIN TIP TECHNOLOGY

One Staff, One Software Package

13 Users, One Computer Center Diagnosed Healthy

By Harry L. Anderson

Special to Computerworld

MILWAUKEE, Wis. — Thirteen Wisconsin hospitals, operating a shared computer center with the Wisconsin Blue Cross Plan, are getting advanced hospital information processing at a fraction of what it would cost them to install their own systems.

Remote terminals, on line to an IBM 370/155 transmit patient and hospital data and service charges to the center which, in turn, provides a wide variety of hospital accounting services. Through the terminals, each hospital can inquire into specific patient records, and receive a response within seconds.

An advisory council, made up of the administrator of each member hospital, establishes policy and guides the operations of the center. Key to the system, which runs under the IBM's Shared Hospital Accounting System (SHAS) is a series of five comprehensive master files set up in advance for each hospital. These include:

- A "hospital profile," containing some 3,000 pieces of data to delineate the hospital's particular requirements and mode of operation. The data here includes patient and medical service classifications, details of accounting procedures and report formats, billing cycles and final bill hold interval — in short, all of the guidance information the computer needs to tailor its processing to hospital specifications.
- A charge description master file, identifying every charge within the hospital and the pricing to be applied to each.
- A room and bed master file, detailing each room and each bed within the room.
- A doctor's master file, listing all physicians and surgeons on the hospital staff, along with their fields of specialization.
- An approved medical insurance file, containing coded details for up to 3,600 different medical insurance programs.

Automated Accounting

Each hospital pays an established fee per patient-day to the center. In return, it receives virtually total automation of all patient-related accounting records, from admission to discharge and settlement of the bill. This includes automatic preparation of the bill itself, with detailed insurance apportionments and full Medicare documentation.

Patient billing is the key application, both in eliminating a tremendous manual recordkeeping chore and as the basis for many administrative control reports. As each patient is admitted, the computer creates a new patient record on the master file and sets up the entries on the room and bed master.

Patient Charges Compiled

Once the patient is in the hospital and the necessary records established, per diem charges are automatically applied to the patient record until the hospital transmits notice of discharge. Service charges to the patient are recorded at the source (laboratory, X-ray, pharmacy, etc.) on a standard charge ticket.

The computer prices the charge item by referring to the master charge file, then posts the charge amount to the patient's record. At the same time, the computer adds the charge transaction to the cumulative record for service utilization statistics and adds the dollar amount of the charge to revenue statistics.

When the patient is discharged, the computer initiates the patient billing routine. First, the system automatically makes the necessary record changes to update the room and bed master file and it breaks out patient-day statistics. A fully detailed bill is printed out, ready for mailing to the patient.

Drawing from the comprehensive medical insurance plan master file, the system

makes all of the charge pro-rations and calculations and prints out any required commercial insurance bill, Blue Cross bill and Medicare bills.

Patient Census Reports

On a daily basis, working with patient admission, transfer and discharge transaction data transmitted from the hospital, the computer prepares both a trial and a final patient census. The standard final

Spotlight on Sharing

census report lists patients by nursing station in room and bed number order and includes the patient's age, sex, religion, doctor and medical program code.

Some of the participating hospitals request census data in a pre-established form to serve as the basis for temperature charts, day reports, pharmacy charge re-

ports and Medicare reports.

Regardless of the particular census format a hospital requests, the full, daily patient census is transmitted from the computer and printed out at the hospital terminal in the early morning hours, before the start of the day's routine.

Special Reports

In addition to the census, the computer transmits daily reports to the hospital for many accounting and administrative control functions. These daily reports include: a balancing of charge items by patient; detailed emission statistics; a listing of patient transfers and discharges; a summary of patient-day statistics, of bed occupancy by private, semi-private and ward classifications and many other reports tailored to the hospital's requirements.

A hospital can use its terminal at any

time to retrieve current in-patient bill status, either in detail or in summary, and including insurance pro-rations.

Inquiry can be made on a patient's current accounts receivable status. In a matter of seconds after an inquiry has been keyed into the terminal, the computer prints out the desired information on the terminal typewriter.

The initial objective of the center was to create the data communications network linking member hospitals to the shared computer for hospital accounting and business office functions.

Now we are studying the feasibility of applying the combination of central computer and on-line terminal to areas of patient care as well. When this is accomplished, the benefits of shared data processing to member hospitals will be multiplied manifold.

H.L. Anderson is vice-president — data processing division of Associated Hospital Services, Inc.

IBM* makes a great disc pack for their 3330 Drives.



So do we.

(We can give you immediate delivery)

Nashua's dependable new 4436 Disc Pack gives you storage for 100,000,000 bytes of data. The 4436 has been thoroughly field tested, and is 100% single disc and pack certified.

Just talk to Nashua Corporation, Nashua, N.H. 03060. Tel: (603) 883-7711.

Or your nearest Nashua Computer Products Division sales office...

Atlanta, Ga., (404) 631-0811
Chicago, Ill., (312) 721-1000
Cincinnati, Ohio, (513) 731-3643
Cleveland, Ohio, (216) 696-5671
Columbus, Ohio, (614) 268-4356
Dallas, Texas, (214) 631-7334
Denver, Colorado, (303) 355-6160
Detroit, Michigan, (313) 886-9890

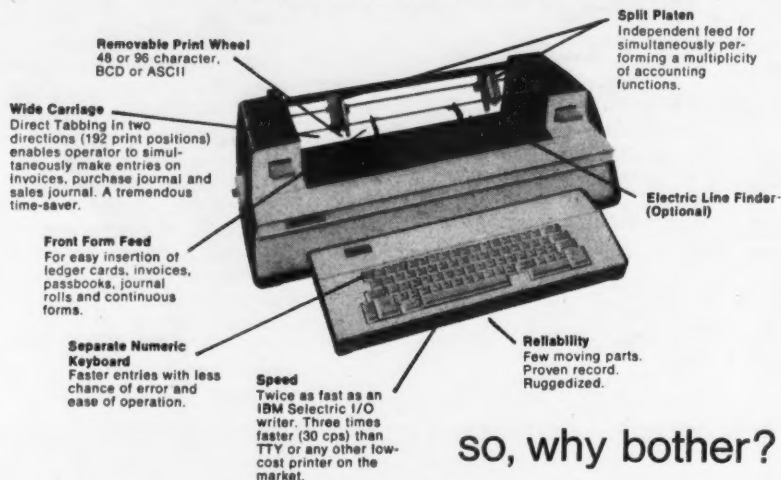
Hartford, Conn., (203) 527-9883
Houston, Texas, (713) 664-1934
Indianapolis, Indiana, (317) 635-0327
Kansas City, Mo., (816) 254-9222
Los Angeles, California, (213) 537-4250
Milwaukee, Wisconsin, (414) 447-1122
Minneapolis, Minnesota, (612) 888-2211
Nashville, Tennessee, (615) 255-7154

New England, Nashua, N.H., (603) 883-7711
New York, New York, (212) 532-6500
Philadelphia, Pennsylvania, (215) 839-3535
Phoenix, Arizona, (602) 267-1991
St. Louis, Mo., (314) 421-6687
Seattle, Washington, (206) 623-0490
Somerville, New Jersey, (201) 722-2922
Washington, D.C., Arlington, Va., (703) 524-8880

*IBM is a registered trademark of International Business Machines Corporation.

NASHUA

If you spec'd an I/O printer
that would turn your 'mini'
into a 'maxi' accounting system...
it would look like this



so, why bother?

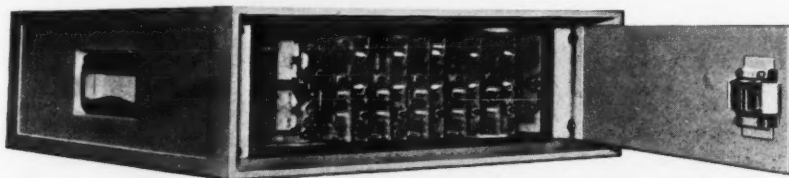
We also have a full line of readers and punches

For more information
call Frank Misiewicz
OEM Products
(201) 935-2200



LITTON ABS
Automated Business Systems
600 Washington Avenue, Carlstadt, N.J. 07072

frequency division multiplexer



FEATURES...

- MULTI DROP: Drop one or more channels at a number of locations.
- MULTIPLE ACCESS: Multi drop channels have equal opportunity contention for processor channels.
- BUSY-OUT: Busy-Out control of remote data sets.
- VOICE-PLUS-DATA: Simultaneous voice channel with four data channels.
- LOOP-BACK: Test features provide rapid system diagnostics.
- DATA RATES: Mix 110, 135, 150 and 300 baud channels.
- CONTROLS: Processes all data set control functions.
- OPTIONS: Many other optional features.

**SAVE
4-WAYS**

- 1 No high speed data sets required.
- 2 No private line conditioning required.
- 3 Modular construction permits starting with one channel and adding others as needed.
- 4 Eliminate long distance phone calls with voice-plus-data.

Data Channel Concentrators and Expanders, Modems, Line Test Units and other Data Communication Equipment

\$415

BASIC UNIT

\$305

PER CHANNEL END

\$3,880

TOTAL COST
5 CHANNEL SYSTEM

OR

\$140/MONTH
(3 Year Lease
With Purchase Option)

Doctors Automate Old Technique To Find Foreign Particles in Eye

KANSAS CITY, Kan. — Two doctors here have developed a computer program to determine the exact location of a foreign object lodged in the eye.

Dr. Thomas J. Cusak, radiologist at Kansas University Medical Center, simply automated a technique developed by William Sweet in 1898. Sweet's method uses X-rays of the eye taken from several different angles. It requires sophisticated mathematics, geometry and graphing to locate the object in a patient's eye by triangulation.

The computer eliminates the cumbersome figuring previously

done by the radiologist. The result is faster, more accurate localization of the foreign body, according to Cusak.

Cases for which this method is used are rare and the radiologist gets out of practice.

The computer, however, "will not forget how to do it. The possibility of misinterpreting the instructions or drawing the lines wrong is eliminated," he added.

Cusak said the computer program is not difficult and can be used on almost any computer.

Cusak developed the program with Dr. William F. Herrin, a computer expert at the hospital.

Meat Packing Industry Modeled

TORONTO, Ont. — The meat packing industry can become more efficient through the use of operations research and computers, according to W.F. McLean of Canada Packers Ltd.

He told a recent conference of the Canadian Operational Research Society about a number of computer models his company has developed plus a new "national beef model" under development.

Some of the models designed to aid front-line managers in the meat packing industry are:

- Formulation and blending for use in certain meat products, feeds and shortenings
- Inventory control systems
- Short-term operating planning systems to help make pricing, sales and production decisions
- Forecasting systems for future livestock supplies.

A additional systems include sales information, manufacturing yield control and livestock grading.

McLean noted these are relatively simple cost-saving applications and they "have only scratched the surface of the potentially profitable possibilities."

The "national beef model" program under development will encompass all Canada Packers' beef plants across Canada. The

model, consisting of 3,000 equations, will attempt to distribute beef as efficiently as possible, taking into account the various conditions of the industry, McLean added.

DP Checks Boll Weevil

AUBURN, Ala. — Alabama cotton scouts will have a new member of the team this year. A computer has joined the group in their fight against the boll weevil and other cotton insects.

"The computer will give the scouts a rapid analysis of the data each week, and will keep growers more up to date than ever before on the cotton insect situation over the state," said Dr. Roy Ledbetter, Auburn University Extension entomologist.

The computer will aid about 100 scouts who will check some 150,000 acres in the state this summer, he stated.

Old Buildings Catalogued

TORONTO, Ont. — Canada is planning to catalogue and classify 100,000 of the country's older buildings with the help of a computer. It is the first project of its kind, according to Labor Minister Martin O'Connell.

The information gathered by the survey will be made available to planners, architects, historians and government agencies.

West Coast Users:

ENTREX, INC.

cordially invites you to
the first West Coast demonstrations
of

System 480 Key-to-disk

the world's most powerful data entry system

at our Los Angeles Sales Office
6151 West Century Boulevard
Suite 928

from 9:00 A.M. to 5:00 P.M.
June 21-23 and June 26-29

COMDATA CORPORATION

7544 W. OAKTON ST. □ NILES, ILLINOIS 60648 □ 312/692-6107

Please call
213-649-1211
for reservations

ENTREX

ENTREX, INC.
168 Middlesex Turnpike
Burlington, Mass. 01803
Offices in key cities throughout the U.S.

CPU Switchboard

Directing data traffic over phone lines into McDonnell Douglas Automation Co.'s 370/195 data center in St. Louis are Evelyn Condray (foreground) and Phyllis Wilson. Through the new custom-designed computer switchboard, eight operators working around the clock route more than 1,500 calls for computer processing. Through a keyboard and video display, the operators connect a caller's data transmission terminal directly into the computer, after which the caller sends keypunched data over phone lines for processing. Processed data can be routed back to the customer in the same way.



TIME-SHARING REPS WANTED

Fast-growing and profitable Time-Sharing company, based in the East, has territories open in Pittsburgh, New York and other areas for qualified and productive rep organizations. Send complete resume on your firm to

CW Box 3643
60 Austin Street
Newton, Mass. 02160

Mind Map Test Gives Better School Results

DETROIT, Mich. — Being able to walk along a straight line is part of the preadmission testing procedure at Oakland Community College (OCC) here. But as a student navigates the line, he encounters a barrier — a chair directly over the line.

How he solves the problem — whether he walks around the chair, kicks it, lifts it out of the way, crawls under it, climbs over it, sits on it, carries it with him or simply stops — is part of an unusual test series being employed to identify the student's learning style and approach to problem solving.

Test Forms Input

Currently, students entering OCC are observed during a three-hour test that not only measures such standard items as reading and mathematical ability, but also evaluates decision-making and such abstract ideas as "the sixth sense" (proprioceptivity), staged behavior (histrionics), physical coordination (kinesthetics) and knowledge of oneself (synnoetics).

Observations and test results are then processed on the school's IBM 360/50, and correlated into a chart called a "cognitive style map," which depicts the student's characteristics and certain aptitudes.

The map is used by the student and his teachers to choose from a wide variety of study methods in courses ranging from social science to advanced chemistry.

Results of the two-year college show that student performance has improved from a national average of 50% success in course study to 87% success.

Primarily, the concept of "cognitive style mapping" using computer analysis here attempts to identify a person's style at a given point in time. However, a spokesman noted that styles do change based on a person's experiences at different levels of educational development.

360
370
1400 **LEASES**

- Prompt Professional Service
- Complete Package Service
- Low Cost — Dollar Savings

Write
Leasing Division Manager
TLW Computer Ind. Inc.
3570 American Drive
Atlanta, Georgia 30341

The Systems Gem

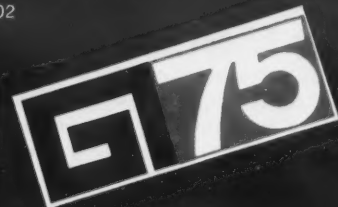
Visit General Instrument booths 119-120
DPMA Exposition, June 27-29

It's a minicomputer world today — and the gem of them all is General Instrument's SYSTEM 75. We emphasize systems because our philosophy of business is selling systems, not just hardware.

GI-75 is a system that can be tailored to the needs of business and industry... a system that's compatible to existing equipment... a system that makes the business world more profitable and more productive. Behind GI-75 is the General

Instrument Corporation, largest of its kind in the systems field. If your philosophy is like ours, then GI-75 is the *only* system for you. Stop at our display and get full information on GI-75 and how it can change the face of your business.

General Instrument Corporation
Hicksville, New York 11802



Editorial

Worthwhile Application?

Two weeks ago we printed the results of a very incomplete New Hampshire study that revealed new cars are involved in more accidents than older cars.

We thought the study was interesting, not because it proved anything, but because we thought it might encourage others to take a fresh look at the mountains of records piling up around them.

Records started accumulating long before there were computers, and, too often we think, no one stops to consider that these records can now be used, with the help of a computer, to uncover trends.

Considering the awful carnage from auto accidents and the long-time assumption that most of them are caused by "driver error," we were more than startled when the National Safety Council told us that nothing like the New Hampshire study (inadequate as it was) had been undertaken before.



'Where's 142-37-1668?

Letters to the Editor

'Satellite' Computers Modify Centralization

Your report of the disastrous experience of a top corporation which centralized its computers into a "nerve center" [Viewpoint, CW, May 24], seemed to point out potential problems for California's DP master planners, who were reported in the same edition to be centralizing their computers.

The difference appeared to be the modification of California's consolidation plan with liberal doses of Commander Grace Hopper's concept of "distributed computing." Small satellite computers are to be connected to the economy-of-scale data centers.

As a DP manager in a state going through similar consolidations, I share an interest in California's success or failure with other Michiganders, who may experience similar results tomorrow.

John W. Simmons, Chief
Data Processing Section
Center for Health Statistics

Department of Public Health
Lansing, Mich.

A Different View Of DP Professionalism

I have been reading the Taylor report and viewpoint. I am not saying that they are wrong or right, but I would like to tell you about a group I belong to.

We have no regular meetings, we have no dues, we have no by-laws or standing committees. We have no dinners with speakers, no social nights, no tests, no glory. If someone has a problem, we try to help him. Data processing problems are the only type of problems we work on, and all this is on our own time at our own expense.

We have a standing offer to try to help at no cost. We don't even have a name, but we do roll up our sleeves and get the work done. We feel this is what data processing professionalism is all about.

Robert E. Sennet

Streamwood, Ill.

Computer School Defended

In the May 31 issue the first "Letter to the Editor" is from a disgruntled graduate (I assume he graduated) of a computer school in the midwest. There are several points I feel I should mention.

First, I think it might have been better if there had been a letter with the opposite point of view in order to provide a measure of balance.

Second the writer says *all* his classmates are doing things other than DP. If this is a fact, then we should know how large his class is and when it graduated. He is really condemning his classmates anyway rather than the school, or else he is saying he is far and away better than they. If he got a position in DP, why can't they?

As to the facts pertaining to the quality of training, of course he was being pushed at a rapid rate. That is exactly what computer schools offer (besides the "unreasonably high tuition rates" alluded to) to someone desiring a foundation on which to build a career before or while working for a degree.

They "whisked him through" in order to make the classroom available for the next scheduled class. But scheduling is all important in any well-run business; so where is the evil in being business-like in a school?

He is in DP so I respectfully suggest he better learn the importance of scheduling or he won't be in DP very long. Incidentally, he admits the opportunity was presented to retake any portion if he didn't feel he had learned enough. What college will do the same under the same circumstances and not leave your record with an "F" grade?

Of course the material was (seemingly) outdated. Did he think he could really assimilate anything other than basics in the six months? He already cried about how much he had to learn in a very short time, so did he want a cram course in OS thrown in to make it tougher?

I would like to point out that a four-year degree course in college is composed entirely of outdated basics, some of them so much so that it is nearly criminal. The entire purpose of any course of education is to present the means of improving yourself, not to automatically do the improving.

To somewhat soften my indictment of the author of the letter, let me add that I am sure there are many schools unscrupulous in their advertising and misleading in their claims made to prospective students, and these are not to be tolerated when found. But a general indictment of all schools is unfounded.

How many college grads could say the same thing about their colleges; how many people could say the same about their automobiles, etc? Does the author really want to throw out the baby with the dirty bathwater?

D.T. Dahinden

Pasadena, Calif.

Thanks From a Programmer

After seeing *Computerworld* constantly chop up IBM and stomp on RCA's grave, not to mention how many times CW has put programmers down, I would like to thank you for writing a very interesting and informative article on "Value System Vital to Programmers" [CW, May 24].

Nick Galante
Programmer

Los Angeles, Calif.

Two Bases Give Two Results

The article "New Hampshire Asks Newer Cars More Risky?" [CW, June 7] talks of a computer-aided study which again proves that "computer" is a badly overworked word. Cars, computers and motor vehicle bureaus have one thing in common. Their conclusions are about as safe as their programmers.

Of 26,026 New Hampshire accidents happening in '71 and involving 1955-71 cars, about 24% involved '71 models, and 17% '70 models. Many of them are mortally wounded, so they are removed from further statistics. Many of them rack up a great yearly mileage, being owned by salesmen, or Hertz or Avis.

Ten percent of '71 New Hampshire accidents involved '69 cars and 7% involved '68 models. But a sensible person who drives only for an occasional trip to the store, or a short way just to work and back each day, is quite apt to be the operator of a two or three year old car.

Ten percent of the listed accidents implicate '67 models, 14% were '66 models and 17% were '65s. But it is these five or six year old cars which are driven by our flaming youth, or else by older people who just don't give a darn.

Accidents per occupant mile have often been used to prove that auto travel is more dangerous than air travel. Why should New Hampshire and the National Safety Council switch to accidents per vehicle year to prove new cars are dangerous? If you switch the two bases, you change the two results.

Richard MacCutcheon

Cleveland, Ohio.

Study Raises Questions

After reading the article "Newer Cars More Risky?" many more questions come to mind. Did the New Hampshire Motor Vehicle Division really believe the cited statistics say anything about the headline question? *Computerworld* must be commended, hopefully, for such a glorious put-on article.

Are the officials at the National Safety Council as obsessed with statistics as the article makes so obvious?

The CW staff writer and "the officials" mentioned share the dubious honor of making the later year models totally responsible for genocide; e.g., "The 1971 model cars accounted for ... accidents, which killed ... people ... At the same time, 1968 model cars were involved in only ..." Strange how the '71s are pronounced accountable while the '68s were merely involved.

Historians will be quite amazed how progressive (?) New Hampshire must have been back in the late '60s and early '70s. Is it any wonder the National Safety Council wanted studies made on the driverless autos of New Hampshire gaining accident proficiency each year. Praise, too, must be bestowed upon the "computer" for its aid in the study.

Beware, the computer will be next. Watch Ralph and Co. prove the case — and with statistics yet.

H.J. Bott

Galveston, Texas

We agree the statistics raised more questions than they answered. Further massaging of the data might reveal why late model cars are involved in more accidents. We believe such computer applications should be encouraged, not ridiculed. Ed.

Stock Chart Not Aligned

After seeing article after article by Alan Taylor on computer generated reports, I cannot understand how *Computerworld* could take Trade*Quotes Stock Trading Summary without first checking its content. A single scan would reveal that a stock that did not have a fraction was not properly column aligned.

How this format was ever acceptable is beyond my comprehension; first to be released by Trade*Quotes and then printed by *Computerworld*?

Lewis Berlent

Storck, Cataldo, Carroll & Associates, Inc.
New York, N.Y.

The summary is printed out on a terminal at CW's printing plant just before deadline and directly reproduced. The format problem, which developed with the May 3 issue, went unnoticed until after Spring Joint. It has now been corrected. Ed.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Full Suit of Standards Needed, Besides Sporadic Ones

At the June Society of Certified Data Processors Boston Chapter meeting, we discussed what standards were needed to ensure proper handling of data processing. That's right — ensure proper handling — not just encourage it! We also discussed how one could tell a good standard from a bad one and whether it was being obeyed.

The results of the bull session were very productive. We came down to three separate groups of items, which seem to create an audit trail for professional standards!

The trail started with a list of "professional duties," items which, if not looked after, would legitimately leave a data processor open to professional condemnation in the event of a snafu.

The idea was that each "duty" should be protected by specific standards. For instance, a "duty" of "accuracy in processing" could be protected by an operational processing standard which would say that "accuracy to within 10 decimal places would be provided unless the using department had agreed in writing to accept some lesser accuracy." (The ones we found are listed in the first part of the survey.)

Standard Characteristics

We then had a second group of items which briefly described the characteristics of acceptable standards. We only got this list down to two.

We thought a standard should be checked by any reasonably competent person, and certainly by someone, such as a CDP holder, who had passed some form of professional examination, as well as someone with experience in the field.

And we also thought the standard should be written so that two persons examining a situation would come up with the same answer, i.e. that the results would be reproducible.

Clearly, a standard which used words like "adequate," which involves individual judgment was not very attractive to the branch members. Who could "define" "adequate"?

Independent Areas

The third area really surprised me. It consisted of a list of independent areas where specific standards were needed, in order to provide an adequate audit trail to support the credibility of the final output of a DP system.

This list was saying that before anyone could really affirm that some DP output would be proper, he would have to know that each of the listed areas was being properly conducted!

He would need to know that the hardware on which the output was produced was up to standard, for instance, as well as knowing the standard of programming.

He would also need to know that the operational area was acting properly, as well as know that the forms were printed properly. Each area represented a complete responsibility — and often a complete expertise which needed its own particular standards and experts. And a failure in any area could fatally compromise the final automatically produced result.

By the time we ended, the list consisted of no fewer than 26 independent areas! Not two, or four... but 26! That really shocked me.

Apparently a DP application — to be safeguarded — must be handled properly by 26 different "experts" — few of whom have any idea of what constitutes quality work among the other areas.

Of course this could be too many. We did not have time to see whether some areas should be omitted. Perhaps they

should be. For instance, overlapping areas should be omitted — not because standards are not essential, but simply because overlapping areas can create overlapping, and potentially contradictory, standards.

Entries Don't Belong

Each of the 26 areas was chosen because at least one of the chapter members thought the integrity of the processing could be lost. Going down the list (shown in the third part of the survey) we find some of the entries do not belong there, either because the processing would not be affected by changes in standard, or because the areas overlap one another.

This latter point is particularly important, because we could get duplicate and contradictory standards if the areas do not really fit together — a knight of old would get a sore arm if his suit of armor did not fit correctly!

Our "suit" of standards must fit as neatly and as completely if data processing is to be completely protected. (And we need that complete protection when we use data processing to produce and distribute data automatically. Or anyway even if we don't — if our paycheck will continue unaffected — our users and users certainly need the protection.)

The Boston branch decided it is only after all these three considerations are known — what our professional duties are, what DP standard areas should be and what the necessary DP standard characteristics are — that it is time to actually create a particular standard!

For instance, the user's standard that the SCDP Technical Committee is currently developing deals with the acceptability of computer tape for DP purposes. It lays down the qualities that the committee thinks should be obtained from new tapes, the quality of any tape which is retained in the system. But the standard assumes that data accuracy is a duty — and that data storage is an area of concern! Until now it has been just a sporadic standard — and this only gives us sporadic protection. Now it can be fitted into the suit.

We often hear of end-point standards, the tape standard — but this is the first time I have seen an attempt at a description of the three foundation layers that must be laid before we can see whether or not we have our necessary suit of standards (perhaps we should call it a "suite" rather than a "suit").

I would like to see this work encouraged.

I would like readers to look down these lists of the foundation levels that are needed to build our DP standards. I would like each reader to critique each of them — to point to the areas that are, or are not, necessary; to point to the characteristics, or duties, that we have omitted.

This way we can start to build the complete suit of armor that data processing so urgently needs to repel the "slings and arrows" that are currently being aimed at anything to do with computers.

© Copyright 1972 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

CRASH

You can prevent Head Crash with System 316
SEND FOR COMPLETE DETAILS.
The TEXWIPE Company
Box 278-A
Hillsdale, New Jersey

Professional Survey on Prerequisites For Developing Full Suit of DP Standards

Suggested Duties of Professional Data Processors

• It is a professional duty of responsible data processors:

- | | Yes | No |
|---|--------------------------|--------------------------|
| 1. To accurately process the data in our data processing applications. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. To present the results so that the information received by the next system, or reader, is accurate. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. To protect data entrusted to us. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. To give warning of all knowable dangers involved in a specific data processing operation to the responsible authorities. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. To do the data processing work expediently. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. To minimize unit cost figures. | <input type="checkbox"/> | <input type="checkbox"/> |

The Characteristics of a Standard

• DP Standards should be such that:

- | | Yes | No |
|--|--------------------------|--------------------------|
| 1. A person qualified by examination and experience examining a data processing application in the light of such a standard will be able to certify that it does, or does not conform to the standard. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The results of such an inspection shall be reproducible, (that is, a second inspector conducting the same examination will come to the same conclusion.) | <input type="checkbox"/> | <input type="checkbox"/> |

Areas of a Data Processing Operation Which Must Be Conducted in Accordance With Standards if the Integrity of a Full DP Operation Is to Be Maintained

• Do you agree these areas can endanger data processing if not handled properly and therefore should be standardized individually?

- | | Yes | No |
|---|--------------------------|--------------------------|
| 1. The Request for Proposals. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The Proposals. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The Proposal Evaluation and Recommendation Presentation. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The Evaluation of Alternatives. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The Specification of the Application. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. The Application Programming Specification | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The Software Utilities Used. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. The Compiler Diagnostics. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. The Compiler Output Code. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The Operating Systems. | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. The Program Testing. | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. The Program Documentation. | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. The Program Operation. | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Application Responsibility. | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. The Error Analysis and Reporting. | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. The Output Verification. | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. The Storage Media Used. | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. The Data Input Media. | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. The Data Preparation. | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. The Financial Auditor Facilities Available. | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. The Operator Qualifications. | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. The Operator Documentation. | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. The Operating Procedures. | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. The Data Control. | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. The Media Storage. | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. The Operation Room Adequacy. | <input type="checkbox"/> | <input type="checkbox"/> |

Will You Help Develop Standards?

Name _____ (Please specify area)
Professional Position _____
Address _____

CDP? Yes ☐ No ☐ SCDP Member? Yes ☐ No ☐

After completing the form, please return to Alan Taylor, CDP, Taylor Reports, c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

Computerworld Sales Offices

Sales Administrator:

Dorothy Travis
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

Vice President — Sales

Neal Wilder

Northern Regional Manager

Robert Ziegel
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

Mid. Atlantic Regional Manager

Donald E. Fagan
COMPUTERWORLD
225 West 34th Street
Suite 1511
New York, N.Y. 10001
(212) 594-5644

Los Angeles Area:

Bob Byrne
Robert Byrne & Assoc.
1541 Westwood Blvd.
Los Angeles, Calif. 90024
(213) 477-4208

San Francisco Area:

Bill Healey
Thompson/Healey Assoc.,
1111 Hearst Bldg.
San Francisco, Calif. 94103
(415) 362-8547

Japan:

Yoshi Yamamoto
Nippon Keisoku Inc.
P.O. Box 410
Central Tokyo, Japan

GOLDEN-50 ANNOUNCES THE 70 MINUTE HOUR

for IBM 360/370 Users:

It's like getting an extra 10 minutes of computer time for every 60 minutes you buy.

370/145 162K, 2314, 7-3420-M7, (9T, 800/1600 BPI), 1-3420-5 (7T, 800 BPI), 3-1403 N1

	8am-6pm	6pm-8am
Weekdays	\$100/Hr.	\$65/Hr.
Weekends	\$45/Hr.	\$40/Hr.
6-Hr. Blk.		
Weekend	\$40/Hr.	\$35/Hr.

360/50 512K, 2314, 7-2401-M6, (9T, 800/1600 BPI), 2-1403 N1

	\$95/Hr.	\$60/Hr.
Weekdays		
Weekends	\$45/Hr.	\$40/Hr.
6-Hr. Blk.		
Weekend	\$40/Hr.	\$35/Hr.

360/20 16K, 2-2415 (9T, 1600 BPI), 1-1403 N1, MFC. All Shifts, All Days - \$15/Hr.

1403 OFF-LINE PRINTING

Call:

John Davidson
(312) 583-5410



COMPUTER SERVICE DIVISION

5320 N. Kedzie Ave. • Chicago, Ill. 60625

Professional's Viewpoint

Let's Not Limit Professionalism

The results of the questionnaire, "Have We Formed the Wrong Society" [CW, The Taylor Report, March 15] indicated that while CDPers were more or less happy with the adequacy of the Society of Certified Data Processors, non-CDPers were not. They voted heavily in favor of a more general society and for only admitting practicing data processors and data processing teachers.

One respondent who feels a

The Professional Viewpoint Page is prepared by the editors of Computerworld in conjunction with the Society of Certified Data Processors.

more general society is needed is a 10-year veteran of the field, Hamilton Armstrong Jr. He has capsuled his arguments, those in favor of the new society and those regarding the usefulness of the CDP qualification, as follows:

I've been reading with interest the various articles in *Computerworld* that have appeared over the last several years on professionalism, certification, standards and the general output of the data processing community. Like many of you, I have been forced by this exposure to wrestle with many of the problems that have been unveiled.

Upon the creation of a Society of Certified Data Processors I felt the need to join this group so collectively we could hammer out the inherent problems. How-

Enrollment Form — Society of Professional Data Processors

Please enroll me as a member of the Society of Professional Data Processors.

I am a practicing data processor. ☐

I am a teacher of data processing. ☐

I will pay the annual dues (\$20) when billed.

Name _____

Professional Position _____

Address _____

When completed please return to the Society of Professional Data Processors, c/o The Professional Viewpoint Page, Computerworld, 797 Washington St., Newton, Mass. 02160.

ever, before I had a chance to make my voice heard, I was rejected because of my lack of certification — and because of my feelings that certification itself is not a sufficient remedy to the problems.

This brings up two problems — why I did not want to take the time to get certified, and more important, what can be done by those of us who are not CDPers.

CDP advertisements show the CDP holder as possessing some of the knowledge needed by a data processing manager. I have been a data processing manager for over seven years, so what does a CDP give me? My experience is better evidence than the certificate! I see no need to wait until I am certified before I get into the problems of professionalism.

And there appear to be plenty more like me. The number of CDPers is about 13,400, so they form a minority in the profession. It would seem, therefore, that the data processing community (that is the active processors themselves, not the data processing industry which acts as our suppliers) should organize a

set of standards which can be easily interpreted by the functioning professionals, by the hardware manufacturers, and, last but not least, by the user or customer.

Does it take a CDPer to see how badly the computer-generated report card illustrated in a recent Taylor Report was handled? Does it take a professional to know when his privacy is being invaded?

I would propose we do not leave these matters in the hands of the data processing industry, or in the hands of the CDPers. I suggest we follow the ideas recently aired here and enroll in the Society of Professional Data Processors and keep it open, as the polls indicated should be done, only to practicing data processors or data processing teachers.

I ask readers to fill in the enrollment form above, and send it to the Society c/o The Professional Viewpoint Page. The sooner this is done, the sooner we will be able to improve professionalism in our chosen occupation. — Hamilton Armstrong Jr., Syracuse, N.Y.

SIMULATOR OPERATING SYSTEM

A HIGH PERFORMANCE 1401/1440 SIMULATOR FOR IBM S/360 - S/370

OFFERS

1400 PROGRAMS WITHOUT OPERATOR INTERVENTION

1400 PROGRAMS UNDER OS WITHOUT SPECIAL HARDWARE

OS STANDARD LABELS FOR 1400 TAPES

1400 WORK TAPES REPLACED WITH DISK

FORM CHANGES WITHOUT CONSOLE INTERVENTION

IMPROVED PUNCH CARD STACKER SELECTION

SENSE SWITCH CHANGES ON HALTS

WITHOUT OPERATOR INTERVENTION

CFO SUPPORT UNDER OS

(FOR MORE INFO CONTACT)

DATAMANN, INC.

#1 Horace Mann Plaza
Springfield, Ill. 62715
(217) 789-2500

PLEASE SEND INFORMATION ON

☐ SIMULATOR OPERATING SYSTEM

NAME _____

TITLE _____

COMPANY _____

CITY _____

STATE _____

ZIP _____

PHONE _____

DATAMANN, INC.

#1 Horace Mann Plaza
Springfield, Ill. 62715
(217) 789-2500



FINANCIAL SERVICES FROM
Horace Mann Educators

Random Notes

SPSS Software Adapted To Run on Series 70 CPUs

ATLANTA — The Statistical Package for the Social Sciences (SPSS), previously distributed only for use on IBM 360 CPUs, is now available in a modified form for Univac Series 70 users, from Emory University.

The National Opinion Research Center (Norc) distributes SPSS in its 360 implementation, and Emory used that with Norc's permission as the base for its version which operates under Series 70 TDOS, TSOS or VMOS.

Inquiries about the Series 70 version should be addressed to Steve Richard at the computing center, Emory University, 30322.

Laboratories Monitor, Report Blood Tests on S/7 With FDPs

WHITE PLAINS, N.Y. — Clinical laboratories using the IBM System 7 can expedite blood tests and reports with a series of field-developed programs (FDPs) from IBM.

The programs collect readings simultaneously from instruments analyzing specimens of whole blood and blood serum, then report findings by test, patient and instrument.

The FDPs carry monthly license fees ranging from \$80 to \$170 for the first 24 months of use, after which payments are waived.

H316 Assembler Runs on 1130

SAN DIEGO — Programs for the Honeywell 316 can be assembled on an 8K IBM 1130 with the DSI-316 software from Decision Sciences Inc. (DSI). Another package, DSI-216, uses the same host configuration to generate programs for Computer Automation 216 and Alpha 16 minis.

Each of the packages is written in Fortran, and is currently available from DSI, 4508 Mission Bay Drive, 92109, for \$1,500.

'Chkstp' Aids OS/360 Testing

WARREN, Vt. — The Chkstp package from Solutions Inc. optimizes test sessions for OS/360 application programs by dynamically replacing non-numeric data with dummy numeric data in the event of an OC7 program check.

After the data substitution and a recording of the error situation, Chkstp allows the test to continue with a reexecution of the instruction that caused the program check.

The package is said to work with Cobol or Assembler programs under all versions of OS/360. It costs \$375 from Box 247, Sugarbush Valley, 05674.

File Gets Many Names

Hospital Stretches RPG Logic Limits

By Don Leavitt
Of the CW Staff

KALAMAZOO, Mich. — By defining the same sequential disk file two or more times under different file names, the DP department of Borgess Hospital realized more flexibility than originally anticipated in RPG-II and Cobol programming, according to senior programmer David R. Thompson.

The hospital "in all probability did not originate the idea," Thompson volunteered, but found it "extremely useful," particularly in situations in which a look-ahead capability could be used to trigger

a change in program logic.

In RPG-II, a single file can be coded as a primary under one name and as a secondary under another name. At Borgess, this renaming/redefining was stretched, in one case, to have the same file coded under a primary and three separate secondary names.

Borgess used 17K bytes of core in that instance, and available core appears to be the only real limitation on this technique.

Separate JCL cards with the proper ASSIGN, DLBL and EXTEND statements are required for each file name defined. Upon execution, the program processes as

if it had two or more different files.

The primary file can be read, in whole or in part, generating data to be used in a second or subsequent pass of the file, controlled by the secondary name or names.

Reread Same Records

By making the secondaries Demand files and using the verb READ, Thompson said, the program can read records up to any given point in the primary, and then go back to reread the same records, under the secondary name, because of data accumulated in the original reading.

Once the secondary reading reaches the stopping point of the primary, the "scanning" operation, under the prime name, can be repeated.

The ability to define the same file several times can also be used to combine several report runs, using the same file, into one. In this situation, the "program" using the primary file produces its report and the secondary "programs" each take their turns producing different outputs from the same input.

Borgess' DP department at 1620 Gull St., operates in a DOS environment under Release 26 on a 32K 360/22.

RPG-BMP Interface Extended to RPG-II And DBomp File Use

TROY, N.Y. — The RPG-BMP Interface package distributed by Digital Solutions Inc. has now been extended on both sides of the interface. It not only links RPG and the IBM DOS Bill of Material Processor (BMP), but offers extended support for both RPG-II and IBM's Data Base Organization and Management Processor (DBomp) as well.

The interface lets the user work in the report-generating languages, rather than Cobol, to create inventory and production control printouts. The package is distributed as a set of DOS Assembler macros with which the user builds his own interface routine tailored to his needs.

The interface links an RPG program with the I/O root phase of BMP or DBomp, and may be generated to communicate with single or multiple master files or one or more master files and their associated chain files, the company said.

Master file processing includes the OPEN, CLOSE, GET, PUT and START KEY functions. Chain file processing is said to allow the RPG program to follow a single-level chain or process a multilevel chain.

The package is available for a one-time license fee of \$250, from Box 424, 12180.

Agencies, Contractors Use Nasa Resource Sharing System...

HOUSTON — The ADP Resource Sharing System, set up by the National Aeronautics and Space Administration to make technically oriented programs available to users other than the developers, has been "reasonably successful," but could be doing more, according to central librarian John Leonard of Nasa's Manned Spacecraft Center.

The system was established a few years ago principally for Nasa centers and Nasa contractors, he explained; however, any computer center in government or industry can access the programs listed in the Announcement of Software Resources abstract journal. "Government," in that instance, is defined loosely enough to include local, state and federal users.

The only restriction on contractors acquiring the software without cost is that they prove that the desired program will be used on a government contract.

The proof needed by the contractor would normally be a letter from the government contracting office, Leonard said.

Organizations that cannot meet this

condition can still get the programs, but for a "modest cost," through the Cosmic clearinghouse at the University of Georgia, he said.

Wide Range of Programs

The programs in the abstract journal fall into categories ranging from aerodynamics, biosciences and chemistry to physics, space radiation and thermodynamics and combustion.

One category includes computer operation and programming aids, largely utility-type programs for a range of different CPUs. Most appear to be written in Fortran, so they are adaptable to other than the originally intended hardware.

The "Announcements" journal can be obtained from Nasa's Scientific and Technical Information Office, Code KSI, Washington, D.C. 20546.

Inquiries about availability of programs listed in the journal should be directed to the head of the Program Sharing Library, Code FD, at the Manned Spacecraft Center, here in Houston, 77058.

...NSF Funds Study of Others

WASHINGTON, D.C. — The National Science Foundation has granted \$100,000 to Public Technology Inc. (PTI) to determine the DP requirements of local and state government agencies, and how to eliminate the cost of duplicating software that already exists for these users.

The 10-month study will attempt to catalog the existing and potential mechanisms by which programs can most effectively be shared by the users, according to PTI spokesman Herb Cantor.

The concepts to be considered, he said, will include Cosmic-like clearinghouse operations, consulting services, user groups, program libraries on time-sharing

networks, or regional shared DP installations.

He noted that shared installations to be studied include those currently in operation in San Gabriel, Calif.; Eugene, Ore.; Tulsa, Okla.; and Cincinnati, Ohio. Each has some unique features, Cantor said.

PTI will be polling its subscribing jurisdictions, he said, and would be pleased to hear from other government agencies to insure that the study truly reflects what the user needs and not what PTI assumes he wants.

The NSF grant covers only the study phase of the project. Implementation of any plans resulting from the study will require additional funds, Cantor noted.

MMS FINANCIAL SYSTEMS. FOR COMPANIES WHO NEED THE BEST.

For more than 50 leading US corporations, MMS software packages are the best. If your company is a leader — or wants to be — find out today how MMS Financial Systems, installed by the most experienced team, gives you the best in software.

All MMS packages

- are tailored to your exact specifications
- operate under DOS, O/S, or IMS on S/360-S/370
- need minimum of only 32K
- are fully warranted for one year!

**GENERAL LEDGER • Accounts Receivable
Accounts Payable • Inventory Management**

Send me more information about

- ☐ General Ledger ☐ Accounts Payable ☐ Accounts Receivable
☐ Inventory Management

Name _____ Title _____

Company _____ Street _____

City _____ State _____ Zip _____

Computer System _____ Phone _____



Send to:
SOFTWARE INTERNATIONAL CORPORATION

A Subsidiary of MMS, Inc. 279 Cambridge Street, Burlington, Mass. 01803 (617) 272-2970

BOSTON 617-272-8265
NEW YORK 212-986-2515
CHICAGO 312-332-4576
SAN FRANCISCO 415-421-0426

ATLANTA 404-255-0039
LOS ANGELES 213-622-3996
PHILADELPHIA 609-228-1100
DALLAS 214-631-6020

Data Briefs

Interactive and Polled Nets Handled by Trendata 2000

SUNNYVALE, Calif. — A data terminal that can operate in both a dedicated polled environment or as an interactive dial-up device is available from Trendata Computer Systems Corp.

The Model 2000 can replace IBM 2740-1 and 2741 units and can communicate directly with IBM 360 systems.

The 2000 has a reverse break feature to allow the CPU to interrupt the terminal, and a hold switch to allow the user to enter additional data without breaking the communications link. The device transmits data at 15 char./sec on private and dial-up lines and is compatible with IBM line adapters, according to the company.

The 2000 is available in 60 days at a lease rate of about \$77/mo from Trendata at 610 Palomar Road, 94086.

ADS 403 Has Dual Loop-Back

CANOGA PARK, Calif. — American Data Systems has a Bell-compatible 103-type modem that can operate in both originate-only and answer-only mode via the use of plug-in modules.

The ADS 403 can operate at data speeds up to 300 bit/sec on dial-up or private nets. The modem features both analog (on the line side) and digital (on the EIA connector side) loop-back capabilities for fault isolation by the user.

The modem is compatible with Bell CBS and CDT data access arrangements and can perform a busy-out function in direct replacement of a Bell 103E data set, the company said. The 403 costs \$550 or \$18.70/mo on a three-year lease. Delivery is 30 days from 8851 Mason Ave., 91306.

Microdata Adds Controllers

SANTA ANA, Calif. — Microdata Corp. has two asynchronous controllers which enable Micro 1600 mini-computers to communicate with local and remote asynchronous devices. The Model 2612 and Model 2612-1 controllers service eight and four, full-duplex channels respectively.

Each model can be installed in a single Micro 1600 I/O card slot. Connectors on the interface board accommodate cables to modems and to terminals with either the RS-232-C Standard or a current-loop interface.

Prices are \$200/channel for the 2612 and \$250/channel for the 2612-1.

Microdata is at 644 E. Young St., 92705.

Experts Differ

Satellite Data Too Costly?

By Ronald A. Frank
Of the CW Staff

NEW YORK — When satellite circuits become available, hardware and software problems will put them beyond the reach of today's data communications user.

This is one of the findings of a report issued by the technology group of Salomon Brothers which analyzes the adaptability of new communications technologies to meet the needs of data users.

Inherent Time Delay

The inherent time delay in satellite transmissions will require the user to re-write his software and add buffer storage capabilities to his network, according to Robert E. La Blanc, manager of the technology group. Until satellite circuits become "sufficiently less expensive than terrestrial facilities," they will not be cost effective for the majority of data users, La Blanc said.

The major time-sharing networks will benefit most from satellite services since they already have delays built into their operation. The user won't know whether a delay in accessing a time-shared CPU is being caused by the queue waiting for a processor port or perhaps caused by a satellite transmission, La Blanc said.

The time-sharing vendors will be able to "spread the software costs to overcome the satellite delays," over their large subscriber base, but individual users will have to absorb these costs, La Blanc said.

But Ralph Miller of Cosmos Engineering feels the companies that provide satellite circuits will have to provide data users with complete communications packages.

The user will have to connect his computer to a satellite transmission system in the same way that a dial-up user now connects to the telephone network.

Today's signal may make use of several differing technologies including cables, microwave and time-division multiplexing.

And the carrier that provides satellite circuits as part of its system will have to give the user this same kind of transparency, Miller said.

Carrier's Worry

"The individual carrier, not the user, will worry about the delay and how to overcome it," Miller predicted. The greater available bandwidth and the superior quality of the circuits will make them much more desirable than present telephone facilities, Miller said.

In evaluating the growth of Bell's Picturephone network, the Salomon Brothers report said that by 1980 more than 500,000 stations could be in operation.

While admitting this projection may be somewhat optimistic, La Blanc said that 25% of the Picturephone network will be utilized for data transmission. The need for good "inexpensive digital transmission facilities" will cause data users to go to the new network, he said. Once a Picturephone network is in operation, users will have up to 1 Mbit of switched service bandwidth available.

And data users will use these facilities regardless of whether Picturephone catches on, La Blanc said.

208 Modem Installed

NEW BRUNSWICK, N.J. — One of the first Bell 208 4,800 bit/sec data sets is operating at Rutgers University. Installed on a special assemblage basis pending approval of a final New Jersey Bell tariff rate, the data set is operating on a dedicated line with Montclair State College.

An 1130 CPU at Montclair State is transmitting data to a 360/67 at Rutgers as part of Bell's Data-Phone 4800 service. The 1130 is acting as a remote batch terminal to the Model 67 which processes administrative, instructional and research data, according to David Kanter, manager of systems development.

Rutgers previously used a Bell 201A data set on a dial-up line to communicate with Montclair; with the 208 throughput has more than doubled, Kanter estimated.

The 208 features analog and digital loop-back tests which are included as part of the seven status lamps on the front of the unit. The 208 has a 50 msec turnaround time with automatic adaptive equalization to "correct for any delay or amplitude variation" on the channel, Bell said.

A three-position test switch on the front of the 208 allows both local and remote tests by the user.

The Rutgers 208 costs the school \$100/mo with an installation charge of \$100. The earlier model Bell 203 that also operates at 4,800 bit/sec costs local users about \$190/mo, a New Jersey Bell spokesman said.

Tempo II With 270T May Save Users 30% Compared to 3705

WHITE PLAINS, N.Y. — Tempo Computers Inc., a division of GTE Information Systems, has a front-end processor which it says is faster and cheaper than the IBM 3705.

The Tempo II, when combined with the 270T terminal control processor system, offers 360 and 370 communications users a savings of about 10% on a two-year lease and a cycle time of 750 nsec, compared with the 3705's cycle time of 1.2 μ sec, a Tempo spokesman said. Savings of up to 30% on a five-year lease are possible, he said.

With direct memory access, the Tempo II can transfer data at rates up to 1.1 Mword/sec using cycle-steal methods, the company said. A built-in program load capability on the Tempo II includes a read-only memory that enables users to initiate program operations from teleprinters, disk and drum memory systems, magnetic and paper tape and both synchronous and asynchronous communications equipment. Card readers, line printers and interface adapters can be supported with the processor.

The Tempo II in a 270T system can

handle up to 255 lines with terminal devices operating at speeds from 135 to 9,600 bit/sec. The system can operate on both dial-up and private lines and speeds up to 50 kbit/sec can be supported on leased line systems, a spokesman said. The Tempo II can upgrade an existing 270T system in the field and the main memory of the processor can be expanded from 4K to 65K words.

A typical Tempo II system with 8K memory console and power is priced at about \$7,500 or "under \$300/mo." A 270T system with Tempo II processor is priced at \$1,650/mo for a system up to 64 lines, with an additional charge of \$10/mo for each asynchronous line and \$25/mo for each synchronous line. Tempo is at 4005 W. Artesia Blvd., 92633.

CSMA Has Comprotek

WILMINGTON, Del. — The Communications Systems Management Association is planning to provide a series of reference works called Communications Procedures and Technical Data (Comprotek). The price to CSMA members is \$100. The association is at 1102 West St., 19801.

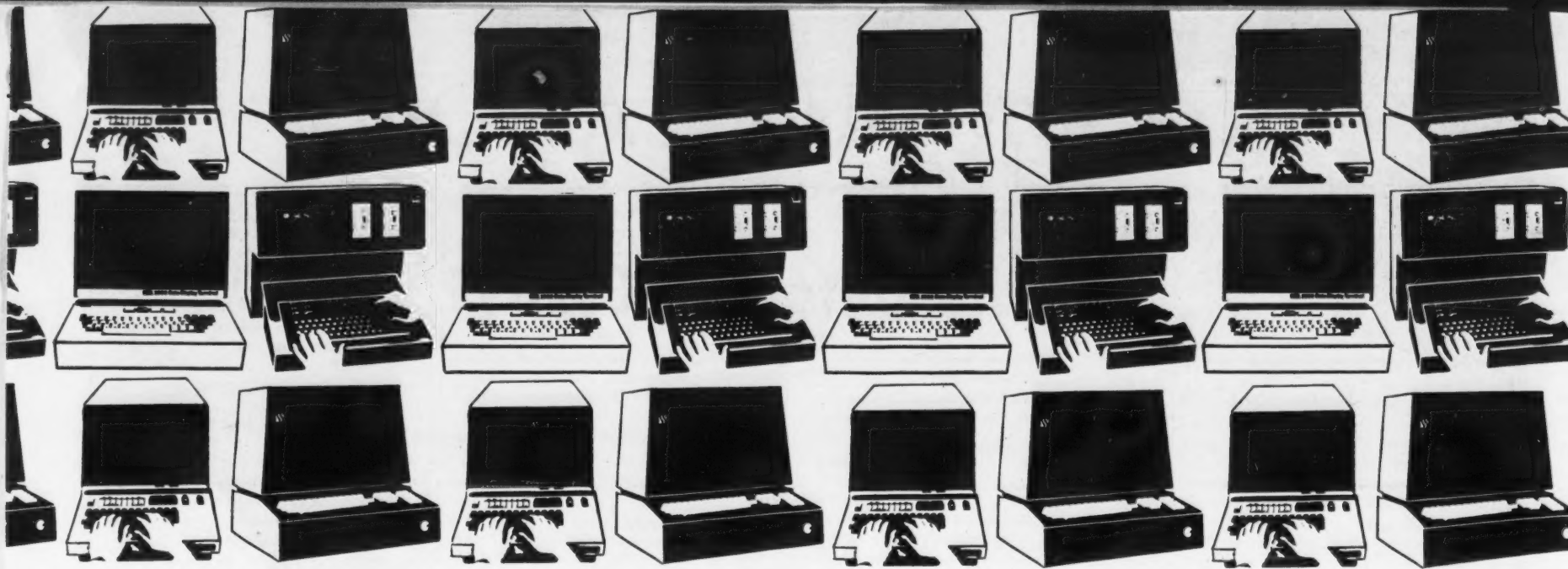


Whose data display systems are keeping orders rolling for a top tire maker?

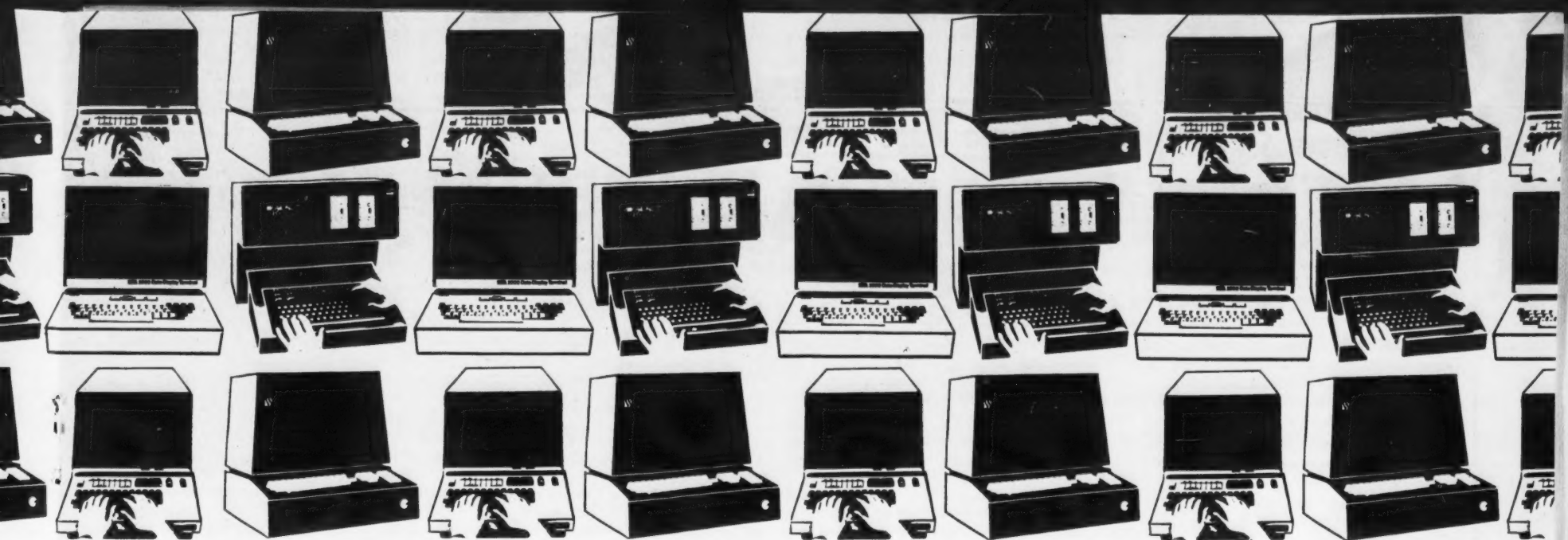
SANDERS DATA SYSTEMS, INC.

Daniel Webster Highway-South, Nashua, N.H. 03060

The can-do systems company . . . today's leader in programmable terminal systems



**Computer
manufacturers know
all there is to know about
data entry. Right?**



Computer manufacturers know computers. But nobody knows data entry like data entry specialists. And Inforex is Number One.

Our key-to-disc systems are way ahead of keypunch. And key-to-tape. And other key-to-disc systems. Take our CRT key-station display. It's an Inforex first. Displays the full user-record at every keystation. Plus helpful system-generated messages that guide operators every step of the way.

Wrong.

Nothing like it for accuracy. And Inforex shared-processor systems give you a broad range of functions to meet data entry needs. Like balance totalling. Calculating and comparing check digits. Automatic pooling on 7- or 9-track compatible tape. Plus attractive optional features. Like On and Off Line Communications. Line Printing. 1600 BPI Tape Drives. Reformatting. Blocking.

It's modern data entry at its best. The kind of data entry you get only from Inforex. Which is one reason we have more shared-processor keystations on the job than anybody else.

Let Inforex upgrade your data preparation — and discover why we call it "a different world." Contact your Inforex Representative. We have offices in major cities throughout the United States, Canada, and Europe. Or write, Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803.

INFOREX

Small Users Served By New CW Feature

To make it easier for small system users to keep up with the latest news, *Computerworld*, beginning with this issue, is making "The Small Systems User" page a regular feature at least once a month.

The page will consist of news of special interest to small systems users and a column that will call the attention of small system users to stories appearing elsewhere in the issue that may be of particular interest to them.

In this issue, for example, a story about a new high-capacity, fast access disk memory for the Varian 620 series appears in the Systems and Peripherals section. There is also a story on a high-speed punched tape reader for users of the DEC PDP minis.

A cross-assembler for the Honeywell H-316 is discussed in the Software and Services Section.

'Broad Data Base' Planned

Manager Hails 'More Effective' Systems

OMAHA, Neb. — The use of a small computer system has provided "a more effective job of managing" for the H.A. Wolf Co., a business which specializes in property management here.

Real estate investment and development, mortgage banking, insurance counseling, and commercial construction are the ventures where the computer comes into play, but each "is too small by itself" to support in-house computers, according to President M.B. Coffey. "Together," he added, "they more than justify" a computer.

Coffey's company has automated general accounting applications, plus special assistance for the business ventures. For example, mortgage programs service 1,800 loans for 22 investors, applying payments against various accounts; an annual tax report for the mortgage holder and an annual escrow analysis are part of the output.

Daily computation of more than \$1 million in earned premiums, plus commissions for salesmen and premium payments, are included in the insurance applications.

Company officials seemed most enthused over the property management

The Small Systems User

system, licensed from IBM. The system gives the users "fingertip access" to data on "each of the rental units we manage," noted Dudley McGrath, vice-president.

Coded data includes number of bedrooms, square footage, color of carpeting, type of building, current tenant and rental rate (base rent, garage, utilities and other factors), McGrath said.

Wolf creates a monthly bill, listing

special charges or past due payments, as well as current monthly charges. A pre-punched card is prepared by the computer, sent to the tenant, and returned with his payment.

By having all rents come due at the same time, and all notices sent out at the same time, "we can make a quick run and have our delinquent payments pinpointed immediately," said McGrath.

This has "eliminated a tenant getting several months behind" in rent, "before we discover it and take action," he added.

Cumulative monthly statements prepared for property managers give the owner tax and other accounting information needed at the end of the year, he added.

The Wolf Co. uses an IBM 3/10, and is building a "broad data base" for statistical analyses, McGrath said.

This will include optimum lease period, average tenure of a unit, and cost of a vacancy in terms of lost rent and "re-do" costs, he said.

The system also brings "better control and greater accuracy," McGrath commented.

Alternatives to S/3 Predicted by Cohan

By a CW Staff Writer

LOS ANGELES — The "first real competition" for IBM's popular System 3 may be the new Burroughs 1712, according to Irwin Cohan, president of the National Association of System 3 Users (Nasu).

In a recent interview, Cohan predicted: "We'll see other new computers in the 96-column area before too long," although he would not speculate on which manufacturers might be planning new, small computers.

Cohan called the Burroughs announcement the "worst-kept secret in the industry," but said growing usage of small computers and the stronghold of IBM means "Burroughs has its work cut out for it."

"The System 3 may not be the cheapest thing in the world," he said, "but nothing IBM has can be called cheap."

Besides competitive CPUs, Nasu members seem to be interested in cost-saving peripherals. During chapter meetings other vendors are often invited to demonstrate products, Cohan said.

The software situation has appeared stagnant during recent meetings, he suggested, with the exception of IBM's regular product releases. The huge manufacturer "probably has hundreds" of System 3 packages, some developed by and licensed from users in the field, he noted.

It is "fantastic" the way small computer usage is increasing, Cohan observed. Even though IBM now has from 7,000 to 10,000 System 3s in use, Cohan believes more new and competing equipment will follow the Burroughs announcement.

Wang Users to 'Swap'

TEWKSBURY, Mass. — Swap, the Society for Wang Applications and Programs, is currently being formed to create and make available an extensive multi-disciplined program library, encourage interchange of ideas, save the user the expense of developing or perfecting already available software and to provide direct user feedback to the company.

All contributed Swap programs will be maintained on a master file at the company here, and distributed to members upon request. Abstract listings and updates will be provided.

Membership fee is \$10. For more information contact Jason R. Taylor, Executive Director, Swap, Wang Laboratories, Inc., 836 North St., 01876.

Only Tab gives you one source for your System/3 media storage & handling needs.

You'd expect the convenience of single-source responsibility from the leader in computer accessory equipment. So, in addition to a complete line of System/3 products, Tab can provide you with its System/3 decollator and burster to speed your printout throughput. For complete information on Tab System/3 support equipment, write Tab Products Company, 2690 Hanover St., Palo Alto, Calif. 94304.



Model 2323 System/3 2 Part Decollator is designed for short-run reports, assures quick loading with its easy-access. Exclusive Tab carbon separator rods assure positive paper control and easy carbon threading. Variable speeds up to 450' per min. Its space-saving compactness (26" x 28") with stacking tables slipped off, offers tuck away storage when not in use. Tab's Multi-Part 2301 Burster is available to complete your System/3 Forms Handling needs.

See us at DPMA
New York, June 27-29
Booths 168, 169, 170
TAB
PRODUCTS CO.



Model 1616-54 System/3 workstation. Just one of eleven models available in 12, 20, 28 and 40 tray complete 96 column card files. 12,000 cards are completely accessible at every level. 5440 Disk Pack storage may be substituted at any level, or 80 column card file drawers. All this plus Tab's 5-year unconditional file guarantee. Compare and then choose the card file meant for your System/3 —the Tab Storage and Handling System.

Bits & Pieces

Varicomp 1000 System Drives Phototypesetter

PLAINVIEW, N.Y. — A universal composing keyboard system to provide low-cost composition input is available from Varisystems Corp. The system can drive any phototypesetter and can interface with almost every hot or cold metal typesetter by changing software, the firm said.

At the heart of the Varicomp 1000 basic system is a Varisystems PAC-16 programmable computer, an 8K-byte processor with word length or 16 bits. Additional 8K-byte memory is optional. Read/write cycle time is 1 msec, instruction fetch time is 6 msec and instructional execute time 3 μ sec.

Pricing for the basic Varicomp 1000 System is \$7,950 from 207 Newtown Road, 11803.

Diablo Disk Drives Added To EPI-118 Minicomputers

ENGLEWOOD, Colo. — Electronic Processors, Inc.'s (EPI) disk system for the EPI-118 minicomputer allows from one to four daisy-chained Diablo Model 31 Disk Drives to be used.

A complete hardware formatter is incorporated as an integral part of the EPI controller. The same EPI disk controller is used for both single-density and dual-density disks, providing 12 Mbits of storage and a transfer rate of 33,600 eighteen-bit word/sec for the single-density disk, or 24 Mbit of storage and a transfer rate of 67,200 eighteen-bit word/sec for the dual density.

EPI's disk controller, including the hardwired formatter, costs \$3,850. The single-density Diablo Model 31 Disk Drive is \$6,055 and the dual-density disk is \$6,265 from 5050 S. Federal Blvd. 80110.

Portable Unit Cleans Tapes

BUFFALO, N.Y. — The 350 Magnetic Tape Cleaner from Syncom Inc. offers double life of the cleaning surface, compared to other cleaners, at about half the purchase price, according to the firm. It is said to feature quick, accurate reel alignment and rapid blade replacement.

The 350 costs \$750. First deliveries are scheduled immediately from 4565 Genesee St., 14225.

Smaller Pieces

Priced at \$19.95, Auerbach on Microfilm Readers/Printers from Auerbach Inc., Philadelphia, is designed to guide the user to microfilm equipment and techniques and to guide him in the equipping of his own installation.

Versatec, Cupertino, Calif. has cut the prices of its Matrix 200, and 1100 printers by up to 20%.

Mini Monitors Axle Production Line

By Frank Piasta
Of the CW Staff

DETROIT — The Chevrolet Gear and Axle Plant here is using a minicomputer-based turnkey system to monitor and control the production and shipment of more than 350 different truck axles.

In addition to shipping and inventory control, the system also supplies Chevrolet management with details and analysis of such areas as production line output and productivity, product defect detection and repair and machine productivity.

The Telecontrol System includes a 4K-word Data General Nova minicomputer equipped with a 64K-word disk file, card reader and a teletypewriter multiplexer interface. A special Telecontrol interface for plant floor equipment is connected to the processor.

The system also includes a Vogue 880E 400 line/min printer, five Teletype ASR 33 terminals, two Telecontrol input boxes and transmitters for status and piece count signals from the plant floor.

Two of the terminals, equipped with special keytops, are positioned on the two axle subassembly production lines to enter production data.

Current Production Figures

A third Teletypewriter at the head of the axle production line provides the line foreman with up-to-date production figures.

The inspection station also uses a teletypewriter to keep track of inspection

and repair operations.

A fifth terminal, used as the system control keyboard and located in the control room, performs such functions as system initialization, data entry, report requests and system communications. Requested reports are printed on the line printer in the control room.

The terminals are all connected to the computer via the teletypewriter multiplexer.

Additional input to the system is provided by two special input boxes which combine sensors with switches. The switches indicate the type of product being produced and the sensors count the units on the production line. These are tied to the computer through a special Telecontrol scanner system which counts the pulses and decodes the type of product data.

The disk file in the control room is used for the program library and to store inventory data.

The software consists of six major subsystems:

- Axle Production Monitoring — monitors and issues reports concerning assembly line production.

- Subassembly Monitoring — monitors production of five major component subassemblies (over 150 different parts) to maintain current inventories for each subassembly.

- Shipping — maintains a balance-to-ship inventory for each model and keeps an up-to-date schedule of shipments due at each plant.

Uses Mini

Terminal Replaces IBM 2922

GARLAND, Texas — SCS Remcom Corp. has an intelligent terminal to replace the recently announced IBM 2922 [CW, May 3] at lower cost.

The 4780, based on a Lockheed mini, is available in three models which vary in line printer speed. All three offer a 4K 16-bit word (8K byte) memory with a cycle time of less than 900 nsec/word. Expansions are available in 4K modules to a maximum of 24K words. A special configuration to handle 28K is offered. Memory may be interleaved when more than one module is installed.

In contrast, the IBM 2922 is limited to 8K bytes with a cycle time of 3.6 μ sec. Interleaving is not available.

The 4780 is compatible with IBM 270X units and can handle Ebcidic transmissions at up to 9,600 bit/sec. The maximum rate for the 2922 is 7,200 bit/sec, according to IBM.

The options available with the Remcom unit are much more extensive than those with the 2922, the firm said. The basic system, the 4780-03, is equipped with a 480 line/min printer, and 600 card/min reader. These are roughly comparable to

the 500 line/min printer and 500 card/min reader on the 2922, the firm added. The Remcom 4780-07 offers a 600 line/min printer, while the 4780-08 increases print speed to 800 line/min.

Transfer IBM Programming

The programming for the IBM 2922 must be done on a computer and then transferred to the terminal. Remcom is currently developing an RPG compiler with editing capability.

Software packages for the 4780 will be offered on an unbundled basis at a one-time charge of about \$100 each. They include: Hasp 360 Work Station, CDC 200 User Terminal and Univac 1004 packages.

Options include 9-track tape transports, CRTs and Teletype 33 KSR terminals.

Prices on a one-year lease for the Remcom terminals are: 4780-03, \$1,065/mo; 4780-07, \$1,200/mo; and 4780-08, \$1,350/mo. Purchase prices are \$36,950, \$38,650 and \$45,525, respectively. Shipments will begin during the fourth quarter of 1972 from 2705 National Drive, 75040.

- Repair Information — maintains records of the number of defects by axle category and defect type. Analyzes defects by shift, day and week and isolates principal defect classifications.

- Production Line Monitoring — supplies and analysis of downtime on the assembly line.

- Machine Monitoring — provides reports at the end of each shift summarizing authorized and unauthorized downtime and out-of-cycle time for 12 finish housing lathes and two transfer lines.

The system was installed by the Telecontrol Division of Vogue Instrument Corp., Richmond Hill, N.Y., over a period of eight months at a cost of about \$200,000.

Mohawk 2400 System Gains Faster CPU, More Peripherals

HERKIMER, N.Y. — Mohawk has upgraded its 2400 Peripheral Processing System with the introduction last week of hardware enhancements, and new software.

Called Phase IV, the enhanced version of the year-old 2400 offers users such advantages as a two-fold increase in core capacity, twice the processor speed, disk communications and a faster tape unit and other peripherals.

The 2400 system is intended to be used for off-line data conversion and communications.

The Phase IV systems use the \$440/mo 2408 processor with a one μ sec cycle time and a memory that is expandable from 16K to 64K in 4K increments.

Available with the 2408 are four tape drives available in 45 in./sec and 75 in./sec versions. Read backward is available.

Prices range from \$230 to \$445/mo.

The low-cost matrix printer includes an I/O controller and features speeds to 100 char./sec.

A 2 Mbyte non-removable disk drive allows direct disk-to-disk communication, accepts dumps from tape, cards or disks. It offers an average access time of 70 msec and is intended for installations with 13 or more keyboards. The cost is \$150/mo.

The 2468 paper tape punch is priced at \$240/mo.

The software enhancements include a choice of programs on tape that enable the 2400 to communicate directly with an IBM 2780, 2968, or 360/20 work station terminal in these systems' own language.

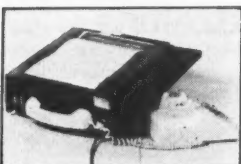
Deliveries on the 2408 processor, tape drives and disk drives will begin in October. The paper tape punch will be ready in November and the matrix printer in January, 1973 for shipment from Palsade St., 13350.

No Nonsense. No Moving Parts.* No Noise.

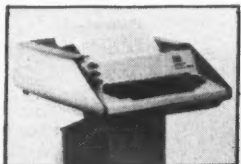
JUST RELIABLE,

HARD-WORKING TIME-SHARING TERMINALS AND PRINTERS.

That go anywhere, because they weigh only 22 pounds and fit under an airline seat. Terminals that interface with any computer system. Acoustically-coupled terminals that work thousands of miles from the nearest computer. Especially terminals and printers that cost so little, you'll think we're kidding. We're not. Fill out the coupon and find out why.



Model
1030
TELETERM®



Model
930
TELETERM®

® Reg. U.S. Pat. Off

* to break, or wear out, or need adjusting.

I BELIEVE YOU'RE NOT KIDDING. SEND ME ALL THE DETAILS ON:

— Model 1030 portable time-sharing terminal.

— Model 930 TTY-replacement printer.

And don't forget to include complete information on the leasing plans available from Data Dimensions, Inc.

Name _____ Title _____

Company _____ Street _____

City _____ State _____ Zip _____

Computer System _____ Phone _____



COMPUTER
DIMENSIONS INC.
9 Ray Avenue
Burlington, Ma. 01803
(617) 273-1550

Computerworld Sales Offices

Vice President — Sales
Neal Wilder

Sales Administrator:
Dorothy Travis
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

Northern Regional Manager

Robert Ziegel
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

Mid-Atlantic Regional Manager

Donald E. Fagan
COMPUTERWORLD
225 West 34th Street
Suite 1511
New York, N.Y. 10001
(212) 594-5644

Los Angeles Area:

Bob Byrne
Robert Byrne & Assoc.
1541 Westwood Blvd.
Los Angeles, Calif. 90024
(213) 477-4208

San Francisco Area:

Bill Healey
Thompson/Healey Assoc.,
1111 Hearst Bldg.
San Francisco, Calif. 94103
(415) 362-8547

Japan:

Yoshi Yamamoto
Nippon Keisoku Inc.
P.O. Box 410
Central Tokyo, Japan

**When you need help
getting, applying,
operating, maintaining
or learning
about computers,**

your CDC general store has the services.



We've developed a whole range of services to help you buy, use and take care of your computer. We can even help if you'd like to use a computer, but don't want one of your own. For example:
Financial Services: Control Data and Commercial Credit Computer Leasing have combined to offer a variety of standard and custom financing plans. For both computer systems and computer services. Whether you plan to buy or lease.

Consulting Services: Our staff of consultants can help you define solutions to business and industrial problems, implement them with the right applications software and computer systems, analyze results. And they can develop cost/benefit analyses to support management decision-making.

Engineering Services: We have several computer maintenance plans. Each designed to fill a different set of requirements. So you can choose what you need, rather than settling for a "package" which may include services you don't want. We can also help in planning, building or remodeling your computer facility.

Educational Services: Control Data Institute offers special education programs to sharpen the performance of your key people. Technical seminars. General management education. Programming courses. Systems analysis courses. Computer maintenance courses. And many more. And if you need a CDI graduate to help staff your computer facility, the placement departments of our Institutes can probably recommend qualified personnel (without a fee).

CYBERNET® Services: The 45 CYBERNET Centers and public access terminals across the nation can help handle overloads, extend system capabilities. They give you access to CDC® 6400 and 6600 computers for timesharing and batch processing. They have extensive libraries of general and application-oriented software. And you can either come to a Center, or plug into the system with a variety of remote terminals. Get the details. This is just a sampling of the help we can provide. We'd like to talk about your specific needs. Why not get in touch? Write: Control Data Corporation, Dept. CW-124, P. O. Box 1980, Twin Cities Airport Station, MN 55111. Or call our hotline collect: 612/853-3535.

**CONTROL DATA
CORPORATION**

Your general store of computer products and services.

Plan Simplifies Conversion to COM

PORTLAND, Ore. — The user who wants to get into COM (computer output microfilm) as easily as possible can give the responsibility for the complete installation to U.S. Datacorp.

The service, known as Leascom, provides the user installation with a complete turn-key production center, for a fixed monthly charge. The company will provide hardware selection and installation, site selection and planning, personnel training and software, a spokesman said.

When installed, the facility is managed and operated by the client staff which gets one week of on-site training by the firm.

The hardware installed will depend on the customer's particular requirements, the company said, and could include any of the available COM recorders.

Optional Service

As an optional service, the firm will include a complete analysis of COM utilization within the user's organization performed by consultants and systems experts, the supplier said. For users planning to sell COM services, a plan is offered to aid the customer in establishing his business.

U.S. Datacorp's experience previously has been in the banking area, working for a bank group, of which it is a subsidiary, but the company will offer its services to users in any industry, the spokesman said.

Software, supplied in either Cobol or 360/370 BAL versions, includes Contrive, a column-indexing package that is said to be faster and to use less memory than the page-indexing methods.

Applications packages stress software for such banking appli-

cations as direct deposit accounting, savings, consumer credit, trust and credit card.

The hardware supplied includes all equipment required for the installation, such as film developing, and copying equipment and light tables, as well as the COM recorder and peripherals. Monthly charges will depend

on the individual customer's needs. A typical installation based on a Pertec 3700 COM recorder will cost \$2,200/mo on a five-year lease or \$3,200/mo on a three-year lease, the spokesman estimated.

The first Leascom system will be installed this summer from 1500 S.W. First Ave., 97201.

Disk Drive for Varian 620 Mini Offers Five Levels of Capacity

SUNNYVALE, Calif. — A high-capacity, fast access disk memory with five levels of memory from 60K to 960K 16-bit words for use with Varian 620 minicomputers equipped with BIC (Buffer Interface Controller) option is available from Data Disc, Inc.

The Data Disc 1733 Disk Memory system uses a single 12-in. plated disk revolving at 1,800 rpm. It can be equipped with up to 128 data tracks, each with its own read/write head. Average access time is 16.7 msec. The transfer rate is 8 μ sec/word, but a 15-word buffer in the controller allows the rate to be adjusted to suit the user's needs, the company said.

Flexible Format

The disk features a flexible format that allows additional data tracks to be installed in the field, so the system can be upgraded to the maximum capacity. The disk can contain 60K, 120K, 240K, 480K or 960K words. Each track is divided into 128 sectors of 60 words.

The system includes a Data Disc 7200 disk memory and power supply, a 1233 Interface Controller, and cables, diagnos-

tics and manuals. The interface consists of a single printed circuit card.

The 1733 system is compatible with the Varian Disk Operating System and all software developed for the Varian disk, the firm said.

Prices for the 1733 begin at \$9,050. Delivery is about 60 days from 686 W. Maude Ave., 94086.

Punched Tape Reader Claimed 50% Cheaper

SANTA ANA, Calif. — The Electronic Engineering Co. of California (EECO) has a compatible high-speed punched tape reader for users of the DEC PDP minicomputers which it says can save about 50% compared to the DEC reader.

The 9000 Series of tape readers can handle data rates of 300 char./sec and is available with tape-handling options including loop, strip, fan-fold or integral spooling.

Installation instructions and instruction manual are included.

Prices start at \$1,280 for the fan-fold version from 1441 E. Chestnut Ave., 92701.

**The Hazeltine 2000
CRT Terminal System,
Price/Performance Leader
in its class... part of the**

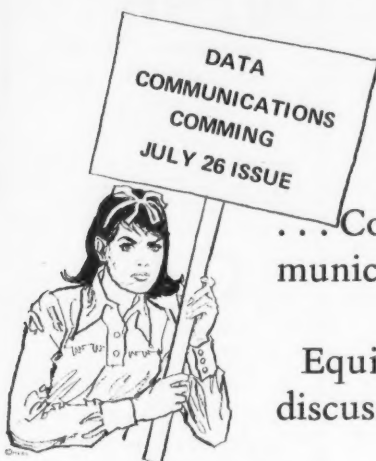
Alexander Smith Carpet-Puter™

a real-time national information network tying together manufacturing facilities, administrative headquarters, service centers, warehouses and customers at Alexander Smith carpet dealers around the country, providing instantaneous stock availabilities and locations, credit ratings, inventory control, shipping information and stock reservations...a network of the future, working today! See for yourself.

Hazeltine Corporation
Computer Peripheral Equipment Greenlawn, N.Y. 11740 (516) 549-8800
EAST NEW YORK (212) 586-1970 BOSTON (617) 588-8700 PHILADELPHIA (215) 676-4348
MIDWEST MINNEAPOLIS (612) 854-6555 CHICAGO (312) 986-1414 CLEVELAND (216) 752-1030
DETROIT (313) 355-3510 ST. LOUIS (314) 862-7261
SOUTH DALLAS (214) 233-7776 ATLANTA (404) 458-9360 HOUSTON (713) 622-0551 WASHINGTON, D.C. (703) 979-5500
WEST SAN FRANCISCO (415) 398-0686 DENVER (303) 388-8844 LOS ANGELES (213) 479-6800

We absolutely refuse to have a failure in Communications

In addition to our regular weekly Communications Section, *Computerworld* will cover Data Communications in a special supplement in the July 26 issue.



Particular interest will be paid to the equipment that makes Data communicate: Modems ... Multiplexers ... Front End Processors ... Communications Terminals ... Communication Dedicated Minis.

Equipment selection processes will be discussed as well.

Communications is the fastest growing segment of the Computer Industry — 40%-45% growth rates are projected in this area of the industry within the next five years.

Computerworld is read at over 95% of all computer sites using Data Communications. Forty-three percent of *Computerworld's* readership are involved directly in purchase decisions for Data Communication equipment and services.



If your company manufactures Data Communications equipment or provides services in this area, you'll want to advertise in this special Communications Supplement Marketplace.

Advertising closing date is July 7.

For more details, rates, or mechanical specifications, call the *Computerworld* representative nearest you, or contact Dottie Travis or Dawn Silva at *Computerworld*. (617) 332-5606.

Position Announcements

University Computer Center Programmer

Application programming for nationally known university computer center. Scientific programming primarily; FORTRAN, BAL, PL/I: experience desirable. Must be able to interface with people and accept responsibility. Job description available. Send resume of education, experience and references to:

James W. Inghram
Computer Center University of Iowa
Iowa City, Iowa 52240
An Equal Opportunity Employer

PROGRAMMER/ ANALYST

Wanted by software house in New York City specialized in office computers. Applicant should be able to accept full responsibility for a group of clients that will be assigned to him. At least 3 years experience with Philips P 350 or Burroughs L series or Victor 820.

Send resume to:
Holland International
Computer Services, Inc.
475 Fifth Ave.
New York, N.Y. 10017

DATA PROCESSING SYSTEMS ANALYST

POSITIONS: 2 highly responsible and challenging positions involving all phases of the development and implementation of a large data base systems utilizing on-line data entry and retrieval procedures and teleprocessing techniques.

SALARY: Starting salary is between \$1,030 and \$1,165/month based on the applicant's previous training and experience plus liberal fringe benefits.

QUALIFICATIONS: A college degree and 3 years of progressively responsible work in Data Processing, two of which involved the development and implementation of systems as described above. First review of applications will be shortly after July 7, 1972.

INFORMATION: The State of Wisconsin is an Equal Opportunity Employer. For further information and an application form please write Wisconsin Department of Transportation, 4802 Sheboygan Avenue, Madison, Wisconsin 53702, Attention: Jerrold R. Bratkovich.

SOFTWARE SCIENCE & ENGINEERING Development & Application

Johnson Service Company, a NYSE listed, Fortune 500 corporation specializing in automated control systems, has several positions for Software Specialists to assist in planning, specifying and developing real time data acquisition and control systems.

Our applications are with mini and small processor computers on core and disk operating systems, which are an integral part of a monitoring and data acquisition control centers. The responsibilities of the scientist and engineer include the continued development of our application library for environmental systems and the development of future operating systems. We are seeking the experienced college graduate as well as people with experience in software development and/or applications.

To the qualified candidates, we offer an attractive starting salary, comprehensive benefits and a 100% tuition refund program. Send resume, including salary requirements in confidence to:



Mr. Chuck Pineau

JOHNSON SERVICE COMPANY

507 East Michigan Street
Milwaukee, Wisconsin 53201

An Equal Opportunity Employer

Buy Sell Swap

2401-1, 2, 3's
7 & 9 TRACT

ATTRACTIVELY PRICED

SALE OR LEASE

ALSO MODEL 40 CORE

Dearborn Computer
Leasing Corporation

4849 Scott St., Schiller Park, Ill. 60176
(312) 671-4410

360

BUY
SELL
LEASE
SUBLEASE

URGENTLY NEED

360/40

Must buy now
for delivery
within 120 days

LUNCEFORD & ASSOCIATES

Valley View Bank Bldg
Overland Park, Kan. 66212
(913) 381-7272

BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP
Available Now 360 MODEL 44 Serial Number 11181. 128K with many features, such as Commercial feature, Storage Protect, Floating Point, Hi-Speed Multiplex Channel and Subchannels. Will lease on length of term you require or will sell. 360 MODEL 30 Serial Number 18762. 24K, 1.5 Mic, with Dec. Arith., Sel. Chan., and Console. \$48,000. We can expand to 64K add Storage protect and timer, and sell for under \$85,000. Also Available 2803-2 2401-3 (9T) 2803-1 2311-1 2402-2 (9T) 2841-1 Luneford & Associates 7500 W 95th, Overland Park, Kansas (913) 381-7272	FOR SALE\$\$\$\$ All Under IBM Maintenance • 1403-2 S/N 13534 Immediate Delivery, \$14,000 • 1444, \$4K, 2 Disk, Complete System \$65,544, Immediate • 1401, 4K, 1 Tape System Complete, \$18,900, Immediate • 2816-1 Tete Switcher, Fully Loaded. Buy at less than 25% of new, rent at 50% immediate • 2314-1. 9 Spindles, 2 Channel Switch, \$633 million Bytes, September, \$79,544 Summit Computer Corporation 785 Springfield Avenue Summit, N.J. 07901 (201) 273-6900	COMPUTER SAVINGS On IBM Computers And Unit Record Equipment All of Our Machines Are Under IBM Maintenance Agreement BUY-SELL-LEASE DEI DATA EQUIPMENT INC. 3306 W. Walnut Suite 304 Garland, Texas 75042 (214) 272-7581	FOR SALE AVAILABLE 10-1-72 (BID ONLY) Univac 1005 III Computer System 4K-Card Processor — Card Read/Punch 2 Potter Tape Drives Under Continuous Maintenance Also Available 1 Diebold Data Safe For More Details Write CW Box 3638 60 Austin Street Newton, Mass. 02160	128K OEM CORE EXTENSION (DATA RECALL) DRASTIC REDUCTION FAR BELOW CURRENT LOW RENTAL RATES FOR ONE YEAR SUB-LEASE Extend your 360/40 or 50 beyond its current size by adding a Data Recall 128K core module extension. Two are available; one for a 360/40 and one for a 360/50. Priced well below current rental prices. September delivery tbi TBI Equipment Div. Time Brokers, Inc. 500 Executive Blvd. Elmsford, N.Y. 10523 (914) 592-4065 Nationwide broker/dealers of DP equipment & computer time Atlanta, Baltimore, Boston, Chicago, Elmsford, N.Y., Los Angeles, New York City, Philadelphia and Washington, D.C.
FOR SALE BY OWNER Honeywell 120 System 16K CPU 4 Tapes 450 LPM Printer 123 Reader 214-1 Punch \$50,000.00 Available Immediately Call or Write R. Hurlburt 385 N. York Road Elmhurst, Illinois 60126 (312) 834-0940	SALE-LEASE 1401's & 360's at Very Low Prices 024 - \$350; 026 - \$1200; 056 - \$450; 077 - \$750; 082 - \$900; 083 - \$2700; 085 - \$1700; 402 - \$1200; 403 - \$1500; 407 - \$4300; 514 - \$1200; 519 - \$1400; 1316 Disk Packs - \$95; 632 - \$500; Dura Card to Tape - \$1200; Cummins Carditioner - \$950; 1620 - \$16,000; 6400 - \$10,000; 1401/360s ALL DATA, 105 Hinricher Willow Springs, Ill. 60480 (312) 839-5164.	FOR SALE 2311-1 Disk Drives 2841 Storage Control Unit IBM 1401-1402-1403 complete system 1316 Disk Packs Also IBM Unit Record Equipment Immediate Delivery WANTED TO BUY PDP's, all models. ARVCO COMPUTER CORP. 213 Main St. P.O. Box 597 North Oxford, Mass. 01537 (617) 987-0185	THE HALSEY CORPORATION The Halsey Corporation wants to buy IBM 1311 Model 2 Disk Drives 1400 and 7000 Series equipment and 360/20 Systems THE HALSEY CORPORATION 1367 Central Avenue Middletown, Ohio 45042 (513) 424-1697	we buy and sell IBM Computer Systems & Unit Record Machines NCR 31-32-33 Etc. Burroughs - Fridens marion 403 Broome Street New York, N.Y. 10013 (212) 966-5931
FOR SALE OR LEASE 360/30 1401 1410 & 729's Corporate Computers Inc. 420 Lexington Ave. New York, N.Y. 10017 (212) 532-1200	DISK PACKS FOR SALE Used 1311 Disk Packs Excellent Condition Contact: Bill Foley (617) 890-6200 Ext. 245	BUY-SELL-LEASE IBM Computers & Unit Record WANTED IBM 360/20 System FOR SALE or LEASE IBM 1401 16K System IBM 2311 Disk Drives THOMAS COMPUTER CORP. 625 N. Michigan - Suite 500 Chicago, Ill. 60611 (312) 944-1401	FOR SALE Complete System Honeywell 115/2 G Series 12K Memory 5 30KC Track Tape Drives 1 600 CPM Reader 1 Card Reader Punch 1 600 LPM Printer All Control Units Extensive APS Program Library CW Box 3644 60 Austin St. Newton, Mass. 02160	FOR SALE OR LEASE 360/20/30/40 CPU's & Systems 1401, 1440, 1620, 2311, 2841, Univac 9200 System All Types Unit Record LEASE OR LEASE PURCHASE Two 1401-16K with 729's One 1401-12K with 729's CALL or WRITE Data Automation Services, Inc. 4858 Cash Road Dallas, Texas 75247 (800) 527-6148 318 W. 28th Street Los Angeles, Calif. 90007 (213) 747-0587 7750 N.W. 7th Avenue Miami, Fla. 33150 (305) 693-3911
FOR SALE Top Quality IBM Unit Record Machines Key punches-Verifiers-Sorters-Accounting Machines-Reproducers-Interpreters Complete Remanufactured at Our Technical Center Call or Write CAC Box 80572 Atlanta, Ga. 30341 (404) 458-4425	SALE OR LEASE 024 - 026 - 056 - 402 - 403 - 077 082 - 083 - 085 - 514 - 604 - 521 - 523 2701 Data Adapter-Complete w/four-4640 Term. Moore Burster w/imprinter - \$800 Selectronic Stand. Reg. Burster - \$600 1316 Disk Packs - \$70.00 Computer Products Co. 529 W. Third St. Cincinnati, Ohio 45202 (513) 721-3399	FOR SALE 4457, 1401/1460 Serial Over 23,000 Compatibility Feature Now on Model 360-040 Available after July 1, 1972 WANTED 360-030 4456 Basic Compatibility Feature and 5856 Program Mode Switch CW Box 3636 60 Austin Street Newton, Mass. 02160	WANTED TO PURCHASE 360/40G or H CONTINENTAL INFORMATION SYSTEMS CORPORATION 700 East Water Street Syracuse, New York 13210 (315) 474-5776	360's WANTED GSM, one of the oldest and largest used computer dealers, wishes to purchase all models of 360 CPU's and peripherals. Call or write for firm offer. Deliveries required for all remaining months in 1972. George S. McLaughlin Associates, Inc. 785 Springfield Avenue Summit, N.J. 07901 (201) 273-5464
SALE or LEASE Honeywell/GE DATANET 30 Immediate Delivery Equipment Management, Inc. 1100-17th St. N.W. Washington, D.C. 20036 (202) 833-1188	FOR SALE OR LEASE By Owner 360/20-C1 2560-A1 2203-A1 Beach Computer Corp. 4932 Main Street Downers Grove, Ill. 60515 (312) 852-1308	360/65 AVAILABLE 360/65 512K System Available for 90-day Delivery Trade-Ins Accepted Will Also Lease	BUY 360 SELL 360 LEASE COMDISCO, INC. 2200 E. Devon Ave. Des Plaines, Ill. 60018 (312) 297-3640	FOR SALE 360/30-65K Loaded with Features Complete I/O Set September Delivery 2314-1 TLW COMPUTER INDUSTRIES For The Best Buy In 360's Dial: (312) 295-2030 Frank Sylvester 222 East Wisconsin Avenue Lake Forest, Ill. 60045 or (404) 451-1895 Tom Williams P.O. Box 80572 Atlanta, Ga. 30341
+ FOR LEASE + IBM MODEL 25 COMPLETE SYSTEM CONFIGURATION: (1) 2025 Processing Unit (1) 1052 Printer Keyboard (1) 1403 Printer (2) 2311's Disk Storage Drives (1) 2540 Card Read Punch WRITE OR CALL GMS Systems, Inc. Attn: Mr. Dan Paty 3475 Brainerd Road Chattanooga, Tennessee 37411 (615) 629-2591 (615) 629-6072 (404) 278-2551	IBM 360 BUY...SELL...LEASE CALL CEI AVAILABLE IBM 360/30 2.0 Mic. Core 1442 N1 & 1443 N1 2401 Tapes 3&6 CEI - The ORIGINAL COMPUTER EXCHANGE THE COMPUTER EXCHANGE INC. 11 GRACE AVENUE, GREAT NECK, N.Y. 11021 516 466-6500	Current Inventory SALE All this Unit Record Equipment in stock and ready to ship at money saving sale or lease prices. RARELY OFFERED: 046, 029, 059, 407, A3, 548, 557, 087, 088 OTHER FINE MODELS: 024, 026, 056, 077, 085, 402, 403, 407, 514, 519, 523, 552, 602, 604, 521, 826 D.P. Equipment Marketing Corp. 260 W. Broadway, N.Y. N.Y. Call Collect (212) 925 7737 Ext. 1	FOR SALE 360/30-65K Loaded with Features Complete I/O Set September Delivery 2314-1 TLW COMPUTER INDUSTRIES For The Best Buy In 360's Dial: (312) 295-2030 Frank Sylvester 222 East Wisconsin Avenue Lake Forest, Ill. 60045 or (404) 451-1895 Tom Williams P.O. Box 80572 Atlanta, Ga. 30341	FOR SALE 360/30-65K Loaded with Features Complete I/O Set September Delivery 2314-1 TLW COMPUTER INDUSTRIES For The Best Buy In 360's Dial: (312) 295-2030 Frank Sylvester 222 East Wisconsin Avenue Lake Forest, Ill. 60045 or (404) 451-1895 Tom Williams P.O. Box 80572 Atlanta, Ga. 30341

BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP
FOR SALE 360/50's 360/40's, 360/30's 2860-3 Selector Channel Also Immed. Available: For Sale or Lease 2820 & 2301-1 Drum Frank Williams  BOOTHE COMPUTER MARKETING, INC. 555 California St. San Francisco, Calif. 94104 (415) 989-6580	360/50 FOR SALE 360/50 for delivery Sept. 1. Will sell as H or HG; with 2 or 3 Selector Channels. For prices, contact: IPS IPS COMPUTER MARKETING CORP. (201) 871-4200 467 Sylvan Avenue Englewood Cliffs, N.J. 07632	Completely Rebuilt 026's with brand new print units Available in quantity 5 day delivery anywhere in the U.S.A. Call: Bob McNeel 215-643-0955 Or your local GENESIS ONE branch office	UCE UNIVERSITY COMPUTER EXCHANGE  The following full systems are available for sale or lease: 360/50 H to I CORE \$140,000 Available 6/1/72 360/44 G, H Sale or Lease 360/75 Sale or Lease 360/91 Sale or Lease UNI 9300 Sale or Lease UNIVERSITY COMPUTER EXCHANGE 2001 Jefferson Davis Highway, Arlington, Va. 22202 (703) 892 2500	FOR SALE IBM 360/370 Units 2702 Transmission Control 20 Data Set Lines 3 Local Lines 2311/2841 Disc Uptime Card Readers 1500 CPM SEND FOR FREE BUY/SELL GUIDE 617-227-8634 We Buy Any Computer AMERICAN USED COMPUTER CORP. 15 School St., Boston, Mass. 02108
FOR SALE OR LEASE 024-\$350; 026-\$1200; 056-\$350; 077-\$750; 082-\$900; 083-\$2700; 085-\$1900; 402-\$1300; 403-\$1500; 407-\$4200; 514-\$1300; 519-\$1600; 548-\$2000; 552-\$1700; 557-\$3500; 602-\$400; 729 (5)-\$4500; 2311 (1)-\$6500; 1448 (1)-\$1500; 1401-C6-16K system-\$40,000. THOMAS COMPUTER CORP. 625 N. Michigan-Suite 500 Chicago, Ill. 60611 (312) 944-1401	360/50 CORE DASD FOR SALE OR LEASE 128K "HG" to "I" or "G" to "H" Also 2314-001 8 Spindles Available Immediately CW Box 3557 60 Austin Street Newton, Mass. 02160 Principles Only		For Sale - By Owner IBM 7094 AVAILABLE IMMEDIATELY Univac 1004/1050 System Available August Call or Write: Oliver & Associates 300 Valley Street Sausalito, Calif. 94965 (415) 332-6262	FOR SALE IBM 1440 1441 12K CPU, 1442 Reader, 1443 Printer, 1444 Punch, 1447 Console with Inquiry, (3) 1311 Disk Drives, 50 Packs. IBM Maintenance. Complete proven software for multi-warehouse order entry, billing, receivable and inventory control. Available October 1972. Finserv Computer Corp. 1462 Erie Boulevard Schenectady, New York 12305 (518) 377-8831
FOR SALE 360/20's July Availability 2020 BC 2 1403-2 2501 A2 2520 A2 Contact: ECONOCOM P.O. Box 16902 Memphis, Tenn. 38116 (901) 396-8600	1440 8K 2 disk system Available Immediately. CMI Corporation 16225 E. Warren Avenue Detroit, Michigan 48224 (313) 889-0440	 BUYING? SELLING? Contact: GREYHOUND ACCURATE APPRAISALS Write: Manager of Brokering Greyhound Computer Corp. Greyhound Tower Phoenix, Arizona 85077 or Call (800) 528-6024 Toll Free 360 EXPERTS	FOR QUICK SALE BY OWNER CARD 1004/5 Serial # 35143 \$2500.00 Plus Freight Contact: Mr. Wayne (516) 379-8550 — or — Write: Multimode, Inc. 1757 Merrick Avenue Merrick, N.Y. 11566	I.O.A. Fully Reconditioned in our plant. Inspected & approved for IBM M/A anywhere in the United States. Immediate Availability 024, 026, 056, 059, 077, 082, 083, 085, 402, 403, 407, 514, 519, 548, 552, 557, 632, 802. Tape & Disc Drives • DEALERS • We can recondition all your IBM unit record equipment and make acceptable for IBM/MA. Call or write for special price schedule I.O.A. DATA CORP. 383 Lafayette St., NYC 10003 (212) 673-9300 Ext. 53
Wanted IBM 360's All models and components wanted. Free Appraisal. ABLE COMPUTER INC. 625 Bard Ave. Staten Island, N.Y. 10310 212-273-3721	 DATASERV equipment inc. BUY - SELL - LEASE All Model 360 Systems & Components 1401 Systems Unit Record Equipment WANTED 2030 G02 (32K 2. Ous.) w/3237, 6960, 7520, 7915, 1051-N1, 1052-8, 2821-2 phone (612) 546 4422 400 Stielard plaza mpls. minn. 55426		WANTED IBM 360/20-D2 D.P. Equipment Marketing Corp. 280 W. Broadway, N.Y.N.Y. Call (212) 925-7737 Ext. 1	BUY-SELL-LEASE WANTED FOR SALE 1403/2 1442/5 402 602 1130 360/20 514 082 360/20's  ECONOCOM / A DIVISION OF COOK INDUSTRIES, INC. P. O. Box 16902 • 2221 DEMOCRAT ROAD MEMPHIS, TENNESSEE 38116 • PHONE 901-396-8600
BUY SELL LEASE 360 COMPUTER EQUIPMENT All models PERIPHERAL EQUIPMENT All Models Your inquiry will be treated promptly and in complete confidence.  CONTINENTAL COMPUTER ASSOCIATES (N.Y.) INCORPORATED Cedarbrook Mall, Wyncote, Pa. 19095 Telephone (215) 885-2525 A subsidiary of Banister Continental Corporation	FOR SALE BY OWNER 65K Mod 40 Core \$38,000 Feature 4457 for Mod 40 \$6,000 Robert R. Russell Systems Marketing, Inc. 3003 North Central Avenue Phoenix, Arizona 85012 (602) 263-0928	LEASE BUY SELL DEAL WITH PROFESSIONALS IN PLACEMENT OF PRE-OWNED 360 EQUIPMENT computer wholesale corp. SUITE 441-447 NATIONAL BANK OF COMMERCE AREA 504 581-7741 NEW ORLEANS, LA. 70112	SYSTEM 360/370 | dearborn computer leasing corporation We Can Fill Your Computer Needs • Buy • Sell • Lease • Subleasing Member, Computer Lessors Association Dearborn Computer Leasing Corporation a subsidiary of Dearborn-Storm 4849 North Scott Street / Schiller Park, Illinois 60176 Area 312 / 671-4410	
	FOR SALE 1401-4K to 16K ***** 1440-8K W/3 Disks Sell us your surplus IBM equipment - Unit Record or Computers. CAC Dept. 'A' - P.O. Box 80572 Atlanta, Ga. 30341 (404) 458-4425			

Time for Sale

CALIFORNIA

S/360-65/50

512K ea. plus 1000K LCS
Peripherals available
16 - 3420
40 - 2314
4 - 1403
Very competitive rates.

Call: Bruce Hanson
UAL Mtc. Base, San Francisco
(415) 876-4057

LET'S MAKE TIME TOGETHER



360/50 Time For Sale
Weekdays or Weekends
DOS or OS
Up to..

- 768K Core Memory
- 8-2314 Disk Drives
- 8-2401 Tape Drives

Plus

- 2-1403 Printers
- and 2540 Card Reader Punch

At a cost YOU can't afford to pass up

Call

Mr. Paul Bonner
Biochemical Procedures
North Hollywood, California
(213) 980-0700

MASSACHUSETTS

Much More!

Raw machine time everybody's got.

Machine time plus applications plus professional service PHI's got. The difference is better throughput, value, performance.

The Machine — IBM 360/65... OS... 1.5 million bytes of core... 32 2314's on-line... four printers... CALCOMP plotter... telecommunications and more.

The Applications — IMS... all ICES programs... simulations... CROSSTABS... CULPRIT... more than 50 programs and languages under one roof.

The Service — A full staff of professional systems analysts... open every day, 24 hours... remote network serving all terminal types.

The largest data service center in New England is ready to serve you. Write or call for our new price list. Contact Michael Zuromskis at (617) 648-8550.

phi
COMPUTER SERVICES, INC.
100 MASSACHUSETTS AVENUE, ARLINGTON, MASSACHUSETTS 01764

TIME FOR SALE

MASSACHUSETTS

Honeywell/IBM Users

Computer time available H200-φ BCD compatible 32K Memory, 6 tape drives, printer, card punch, reader, and console. Data Products off line printer, also tape cleaner available on a per reel charge.

Call Bob Citrano
(617) 426-6500

NEW JERSEY

SYSTEM/3

- Time Available - All Shifts
- Complete Keypunch Support
- Located Near Gdn. St. Pkwy.
- 1100 LPM Printer



Tel. Don Thee
(201) 272-4350
IFA Computer Services, Inc.
Cranford, N.J.

S/360/50/40/30

1287

2671 Paper Tape Reader

ALL SHIFTS

Call: Roy Einreinhofer
Popular Services, Inc.
(201) 471-2577

NEW YORK

NASSAU COUNTY 360/30

65K REL 26 DOS
— 2540 1000 CPM READ/PUNCH
— 1403/N1 1100 LPM PRINTER
— 2314 with 3 SPINDLES
— 4 800 BPI 9 TRACK 60KB TAPE DRIVES

ALL SHIFTS — \$50 PER HR.
Remote or hand-on

also
1287 OPTICAL SCANNER
with handwriting feature
NEGOTIABLE RATE

Call between 9 & 5
(516) 921-7700, Ext. 331
After 5PM call — (516) 921-3182

LAFAYETTE RADIO ELECTRONICS

111 Jericho Turnpike, Syosset, L.I.

FREE

Computer Time Report
National Edition
Compare prices in New York with those in effect throughout the country.
Send for your free copy:



TIME BROKERS, INC.
500 Executive Blvd.
Elmsford, N.Y. 10523
(914) 592-4065

Nationwide brokers of computer time and DP equipment
Atlanta, Baltimore, Boston, Chicago, Elmsford, N.Y., Los Angeles, New York City, Philadelphia and Washington, D.C.

ADVERTISE IN
COMPUTERWORLD

TIME FOR SALE

NEW YORK

ANCHOR SYSTEMS

The Service Bureau
That Gives a Damn!
(212) 571-0905

ROCKLAND COUNTY

Time for Sale on:
IBM 360/40
128K 4-2401 Mod II, 4-2314
Soon - IBM 360/50
512K 4-2401 Mod V, 6-2314
3 Shifts
Mr. Netburn - 914-634-8877
Information Science Incorporated
New City, N.Y.

COMPUTER TIME AVAILABLE

We are Brokers for IBM,
RCA, etc.
LOW RATES

COMPUTER RESERVES

393 Seventh Ave., NYC
594-7935

ILLINOIS

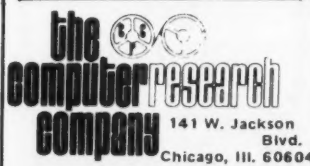
EXCESS COMPUTER TIME AVAILABLE

IBM 360 and 370 USERS
On Our 370/155
1024K Computer
100% Compatible

3330 DASD 4 Modules, 2314's
DASD 16 Modules, 3211 Printer
2000 LPM, 1403 Printer 1100 LPM, 10 3420 Tape Drives,
2540 Card/Punch, 2501 Card Reader, 2701 TP Control Unit.

FOR ONLY \$120 FULL PRICE

Per wall clock hour for
DEDICATED SYSTEM
on our third shift!!
RON ELLIS (312) 922-6141



141 W. Jackson Blvd.
Chicago, Ill. 60604
Largest Computer Time Sales Company

Software for Sale

CATS-A/P

ACCOUNTS PAYABLE CASH REQUIREMENTS

1. Multi-company Environment
2. Unique ID for Each Company
3. History File of Payments
4. Handles Manual Checks and Distribution
5. Purchase Analysis Report by Vendor

CATS-A/P takes all vendor invoices received by the user and creates from them entries into the general ledger and overall job costs. This program is under control of the CATS MASTER which is provided FREE with the purchase of any of the CATS programs.

Accounts Receivable, Balance Forward and Accounts Receivable - Open Item also are available.



For information call or write:
John E. Finch
Vice-President, Marketing
COMPUTER WARES, INC.
P.O. Box 31205, Birmingham
Ala. 35222 - Phone 205/595-0511

SOFTWARE FOR SALE

7080

SIMULATOR?

We are interested in locating software which will execute 7080 Programs in an O/S region.

Contact:
Mr. G.R. Langford
Galveston, Texas
(713) 763-4661 Ext. 331

CANADIAN COMPANIES

Interested in Lease or Purchase of Fine Applications Software

ACCOUNTS PAYABLE ACCOUNTS RECEIVABLE PAYROLL and LABOUR

- MULTI-COMPANY FEATURES
- ANS COBOL-OS/DOS
- UNLIMITED SUPPORT AND ON-SITE TRAINING
- EXCELLENT DOCUMENTATION

For Details Write:
Software Development/Canada
P.O. Box 32, Station 'S'
Toronto, Ontario

NCR

315 to Century 200 COBOL Conversion

ESB's copyrighted COANTRAN software package will analyze and translate 315 COBOL source programs to save you time and money. Try it!

Call Bob Morgan: (215) 564-4030
ESB Incorporated
5 Penn Center Plaza
Philadelphia, Pa. 19103

ESB INCORPORATED WORLD LEADER IN PACKAGED POWER

ACCOUNTS PAYABLE PAYROLL/PERSONNEL

Versatile, user-tested systems

Available separately:

TAXBREAK

Payroll tax calculation module

ARGONAUT INFORMATION SYSTEMS, INC.

P.O. Box 112
Walnut Creek, California 94596
Telephone: 415-937-4675

* General Ledger

* Accounts Payable

Management responsibility reporting. Multiple company processing. Chart of accounts independence. Installed in 5 days.

ANCOM

The Financial Systems Firm

San Diego, 1250 Sixth Avenue
(714) 238-1242
(212) 489-1660
New York
Dallas/Fort Worth (817) 738-2151
Honolulu (808) 955-6631
Chicago (312) 986-1346
Los Angeles (213) 649-1616
Cincinnati (513) 961-0776

TOSSL

APL/COBOL-SOURCE PROGRAM LIBRARIAN

- Program Security
- Tape Library
- Simple Maintenance
- Multiple Options
- Speed Compiles

FOR INFORMATION:
SHMARUK ASSOCIATES
19 EHRET DRIVE
MONSEY, N.Y. 10952

SOFTWARE FOR SALE

BANKING APPLICATIONS

OS/DOS USER PROVEN
MULTI-BANK

Payroll
Personal Trust
Stock Transfer
Installment Loan
Savings
Commercial Loan
Pension/Profit Sharing

Operational, Tested,
Proven By Multiple
Users, User References



General Computer Services, Inc.

1332 Meridian St.
Huntsville, Ala. 35801
(205) 539-9492

OLD PDP-8 AND NEW NOVA USERS:

Now you can run your old PDP-8 programs on any Nova series computer. The 8-SIM program permits almost any PDP-8 software, including FOCAL, to be run on the Nova. On a Nova 800 the average instruction execution speed is slightly faster than on a PDP-8/S. The basic program occupies 268 (10) locations while a high speed tape version occupies 293 (10) locations. Additional equipment may be supported with minor changes to the program. Tapes provided are ASCII tapes for the low and high speed program and three FOCAL 5-69 binary tapes. The \$100 purchase price includes documentation consisting of a FOCAL 5-69 writeup, Nova FOCAL operating procedures and 8-SIM program description plus the five tapes. Inquiries should be directed to:

Bruce Ray
273 Center, No. 4
Salt Lake City, Utah
(801) 359-7318

MSA PAYROLL/PERSONNEL SYSTEM THROUGHPUT SPEED AVERAGES TWICE THAT OF OUR LEADING COMPETITOR. PAYING FOR THE SYSTEM IN A MATTER OF MONTHS!

Over 100 sales in less than 2 years. Tax change flexibility through use of "ALLTAX" modules. Pay periods can be weekly, bi-weekly, monthly, or semi-monthly. Special Report Generator included for customized reporting. Documentation that exceeds the industry standard. Sales and support in principal U.S. Cities. Comprehensive warranty.

100 DEDUCTIONS
6 LEVELS OF CONTROL
SALARIED AND HOURLY PAY
COMMISSIONS & SPECIAL PAY
BANK SERVICES FEATURES
LABOR DISTRIBUTION
COMPLETE TAX REPORTING
SALARY HISTORY
EDUCATION PROFILE
SKILLS INVENTORY
PERFORMANCE RATING
IBM 360 370 ANS COBOL
DOS OS

Write or Call:
CHARLES F. SIMS
MARKETING
MANAGEMENT SCIENCE
AMERICA, INC.
1389 PEACHTREE STREET N.E.
ATLANTA, GA. 30309
(404) 892-3390

MSA

computer industry

a Computerworld news section about the nation's fastest growing industry

June 21, 1972

Page 23

CI Notes

Singer Signs DEC Pact

MAYNARD, Mass. — Singer Co., Simulation Products Division has signed a three-year OEM multi-million dollar product contract for purchase of up to 119 computer systems from Digital Equipment Corp.

The contract enables all Singer divisions to order computer products and related peripherals from DEC under the OEM quantity discount agreement. DEC computers will be used in Singer's Link trainer simulator systems.

Four Phase Has New CPU

CUPERTINO, Calif. — One of the key elements in the Four Phase contract with Western Union [CW, May 31] involves a new version of the Four Phase central processor, which will be introduced this fall.

The unit has 74K of memory and can handle up to 32 full screen CRT displays, in contrast with the present unit which can handle only up to eight full screen displays.

The memory is expanded by using 2K chips instead of the present 1K and by placing 36 on a board instead of the present 24.

IBM Announcement Seen

PALO ALTO, Calif. — Several independent peripheral manufacturers here are expecting a series of new IBM CPUs this July.

In addition to the long awaited 125, they expect several new machines in the 155 and 165 class, thought to be called the 157 and 167. Memory makers are particularly worried, because their latest intelligence seems to indicate that all memory will be pulled "under the hood" and will not be subject to replacement with independent memory.

Supershorts

Codon Corp. has agreed to assign Data Products Corp. exclusive U.S. marketing rights to Codon's computerized distribution management information system.

MSI Data Corp. has installed its 10,000th MSI terminal.

True Data Corp. has received an order for 102 Model 600 card readers from Remcom Manufacturing Co. for incorporation into a new line of Remcom 2775 replacement terminals.

Entrex, Inc. has booked orders for 60 System 480 key-to-disk systems in the first four months of 1972.

Insurance subsidiaries of CNA Financial Corp., Chicago, have contracted with the Data Products Division of Lockheed Electronics Co., Inc., for marketing of a proprietary configuration of the SUE minicomputer systems to independent insurance agencies.

Inforex, Inc., has been assigned U.S. Patent No. 3,657,706 covering technical aspects of its basic products, the 1301/1302 data-entry systems. The patent applies to the swapping of format controls between the system's disk and memory units, the polling of keystations for input data, each with independent format control, and the retrieval of certain information from memory.

Senator Requests Reports

Multinationals to Come Under Scrutiny

WASHINGTON, D.C. — The Senate will be taking a hard look at the activities of multinational corporations, such as most U.S. mainframe computer makers, in the next several months.

Sen. Abraham Ribicoff (D-Conn.), chairman of the Senate Subcommittee on International Trade, recently invited all interested parties to submit "factual, documented papers covering key issues raised by the activities of multinational corporations."

The computer industry — not only the large mainframe makers, but also the smaller independent peripheral makers now moving into the overseas markets — are expected to figure in the investiga-

tions in a large way, sources here said.

Ribicoff said legislation designed to save American jobs by eliminating certain tax privileges enjoyed by multinational corporations and by establishing a wide range of import quotas is currently pending before the Committee on Finance.

In spite of all the rhetoric on the alleged benefits and costs of multinational corporations, there is still an abundance of ignorance surrounding the operations and effects of multinational corporations, he said.

The subcommittee, he stressed, is interested in quality submissions, well documented by factual material covering the following issues:

- Do the problems, or "costs," generated by the spread of multinational corporations outweigh the advantages or "benefits?"

- What kinds of action are open to national governments, including the U.S., acting separately or together, to maximize the benefits of multinational corporations and minimize the costs as they affect the goals of achieving full employment and balance of payments adjustment?

- The effects of multinational corporations on U.S. labor in manufacturing industries

- The multinational firm and the balance of trade and payments

- Technology, R & D, and the multinational firm.

Several of the large computer companies have been pressing the view that multinationals contribute more to the U.S. than they take away, sources noted.

In addition, these firms have noted that U.S. computer companies contribute a trade surplus which helps the U.S. balance of trade position.

However, critics of IBM have indicated that they might use the balance of trade argument in order to gain some antitrust exemptions in the U.S.

Number of Profitable Firms Rise In Remote Computing, T/S Area

PHILADELPHIA — The number of profitable firms in the remote-computing and time-sharing area has risen to 40 from the 28 listed last year, according to *Time Sharing Today*, published by Time-Sharing Information Services, Inc.

At the same time, the research firm notes that the time-sharing utility predicted several years ago has not emerged, but a "remote computing utility" seems to be growing in its place.

The time-sharing utility has not emerged for several reasons, the firm said.

"First, the pioneers in time-sharing had not counted on the difficulties of systems integration. Remote-computing is a combination of computers, communications and terminals. To be viable as a business all three components must be operational and cost effective," the report says.

"This system integration combined operations systems which were not what the computer manufacturers had promised; phone lines not suitable for data transmission; and terminals which appeared not to be aware of the National Bureau of Standards, much less its purpose . . .

Economics Less Compelling

"Second, computers aren't that expensive, and their cost is still coming down. Thus, the economic reasons for sharing a computer have become less compelling.

"Third, time-sharing companies began learning they can more successfully and profitably sell service and tools for solving problems than merely offering raw computing power . . .

But since the idea of a time-sharing utility has fallen by the wayside, a new concept, the remote-computing utility has risen to take its place, the firm notes.

"The financial squeeze forced time-sharing companies to minimize their dependence on the one-time problem solver who had proved a disappointment as a profit generator. This was when time-sharing companies learned they had to talk less about raw computing power and more about services."

This, coupled with a surge of business customers that appeared in 1971, created a need for a network of remote computing centers, the report said.

"The network customer is the one who needs a computer/communications system which permits users scattered through a large geographic area to access a common computer system and its files, thus enabling these users to share programs and data," the report explained.

"Remote-computing networks," the firm added, "provide the user with a total systems approach to his data communica-

tions needs. The user gets a reliable, professionally maintained system with more redundancy, security and reporting than he alone could afford; he pays only for that he uses."

The firm predicted that the market for such networks would grow "rapidly" in 1972.

After Recession

Changes Seen in European DP

NEW YORK — "After the 1971 recession the European computer industry will not be the same," observed M. Andre Chargueraud, president of Diebold Europe. "New and more aggressive strategies are now a necessity for even the largest manufacturers."

"New approaches, and new services of an improved quality are the daily diet of service companies," he said here recently.

Since the DP industry had known only a boom type of business environment, a business slowdown therefore hit it particularly severely, he said.

"Most manufacturers did not make their quota. In major countries some of the larger companies made less than 50% of their order quotas. Shipments were not affected in any important way since 1970 had been a good year for order taking."

"For service companies 1971 was a 'shake-out' year. In the UK casualties multiplied. Everywhere else manpower went down and profits plummeted."

"1972 has seen the return of confidence everywhere and this is probably the main factor in today's business recovery."

"For the European computer industry, recovery is still slow in a much more selective and cost-conscious market. Begun in the 1971 slowdown, a major restructuring of that industry is taking place, Chargueraud said."

In 1971 a certain number of agreements of cooperation and regrouping had already taken place.

"The big move came early in 1972 when CII, Siemens and Philips decided to join their efforts in the computer field. This move came rather late and is still only half of a solution to the task of making the European computer industry a successful one," he added.

"In their home market, European manufacturers have, in most cases, an acceptable market position." Based on the value of installed equipment, he said, ICL has 44% of the British market; Siemens has 13% to 14% of the German market; and CII has 4% to 5% of the French one.

"But computers are sold in a world market and it is at that level that success or failure will come," he observed. If exports are included: ICL has 2.9% of the world market; Siemens 1.1%, CII and Philips each less than 0.3%. In other words, together they have less than 5%.

"And yet ICL has not joined Siemens, Philips, CII, leaving the group with a world market penetration of less than 2%. This is low for an industry to be able to compete effectively on a worldwide basis."

Chargueraud explained one of the reasons given for the nonparticipation of ICL is the fact that that company wants to follow the route of having non-IBM compatible systems whereas its continental counterparts feel that a large degree of compatibility should be planned.

"By the late 1970s when the new systems resulting from the 'club's' activity reach the market, technological advances will have made that problem obsolete."

The clearly stated intention of all parties is not to merge their computer activities although the February 1972 agreement has often been described as a merger, he said. "Cooperation is the word: each partner will retain his identity and his business activity."

"The group will work together in many fields, including the redistribution of market territories and probably the establishment of common subsidiaries for research and specific production."

"It is an important step forward but is not sufficient. Against monolithic competition, European manufacturers must merge their activities as soon as possible to succeed," he emphasized.

"A more powerful group would not by any means be a serious threat to American-made computers (either manufactured in the U.S. or locally). It might, however, bring stronger competition, and close (to some extent) some market segments, leaving many business opportunities for American ADP firms," Chargueraud continued.

Isomet Develops Erasable Optical Recording Medium

OAKLAND, N.J. — Isomet Corp. has developed an erasable optical recording medium using doped single crystal lithium niobate (LiNbO_3).

The local rearrangement of electrons in the crystal permits a stored image to be erased and a new recording performed in the same crystal area. No wet processing for development or fixing is required. This permits real time recording and readout, the company explained.

For holographic recording the material supports a phase, volume hologram, which results in high diffraction efficiency holograms and multiple image storage in depth, according to the firm.

Light from an argon laser is split into two beams. The signal beam is modulated by the test pattern transparency and then focused by a lens to a 2 mm spot at the crystal location.

The reference beam intersects the signal

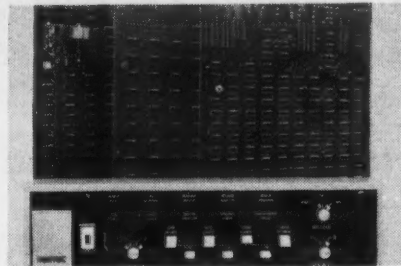
beam at the crystal location, and the interference pattern of the two beams is recorded. For readout, the signal beam is turned off and the reference beam, upon passing through the hologram, will reconstruct the original pattern on the screen.

Some typical characteristics for holographic recording for a 1 mm thick slice of Isomet No. 127 doped LiNbO_3 are: resolution, 4,000 line/mm; exposure

New OEM Products

time, 20 msec; diffraction efficiency after enhancement, 1.5%.

Erasure may be accomplished either optically or thermally. At room temperature, the thermal lifetime of a stored image is believed to exceed several months. For archival storage, a periodic



Pertec Communications Modules

refresh cycle will be needed.

Prices vary widely depending on the customer's individual requirements, the company said. Delivery will take from three to 10 weeks from 103 Bauer Drive, 07436.

Pertec Adds to Line

LOS ANGELES — Pertec Corp. has introduced a modular communications system, a 100 Mbit disk drive and a tape transport. The data communications logic modular series provides binary synchronous communications in either Ansi or Ebcidic languages. The system uses microprogramming techniques and adapts commonly used input/output devices to



EAI Tape Cassette Transport

IBM compatible data communications systems, according to the firm.

Because of the variety of interface levels available, the communications logic modules can be used for point-of-sale devices, remote terminals, credit verification systems, as remote site 2770/2780 equivalent systems, and as multiple purpose on- or off-line data entry systems incorporating communications capabilities.

The D-3000 series disk drives for 2315 disk or 5440 cartridge in single or dual disks with up to 100 Mbit capacity in one drive are also available now.

The disk drives are identical in appearance, size and interface and are interchangeable to accommodate either front loading or top loading configurations.

Requiring an 8-3/4-in. height by 26-in. depth of rack space, the drives have an average access time of 35 msec.

In addition, Pertec has developed a 10-1/2 in. reel synchronous digital magnetic tape transport.

The T-8000 series are IBM and Ansi compatible and available in read-after-write, read/write and read only models with tape speeds to 45 in./sec and data transfer rates up to 72,000 char./sec.

Other Products

Omron Systems, Mountain View, Calif., has announced a head/track disk memory with a data transfer rate of 7.5 MHz and an average access time of 5 msec, called the Omron 6000.

Electronic Associates, Inc. has introduced a cassette tape transport designed specifically for OEM digital applications. Single and double capstan models, with and without electronics are available.

The Per Data Series A-800 Analogue Tape Transport is available for \$2,550 each in OEM quantities from Peripheral Data Machines, Hicksville, N.Y.

ICP cassette recorders from International Computer Products, Inc. include the PI-71, which permits bidirectional character-by-character operation during both record and playback on an asynchronous basis up to 350 char./sec.

Cadmac, a computerized interactive graphics system developed by Computer Equipment Corp., Rockville, Md., utilizes a single work surface and processing system for both digitizing and plotting functions. Cadmac offers compatible, stand-alone capability including control-processing, visual display facilities and software for developing a design from initial sketch or diagram to finalized drawing and/or control tape, the firm said.

How will they remember you, if you're not there?
The Japanese may not need your radios. Or TV's.
Or little cars. Or stay-pressed shirts.

But they do need your computer's peripheral equipment and components now.

The first U.S.A.-Japan Computer Conference is designed for you to show off the things you make that the Japanese need.

They need you. Find out how much October 3-7. In Tokyo.

The First USA-Japan Computer Conference.

We need you in Tokyo.

Your name _____

Company address _____

For information on this conference write
U.S.A. Exhibits Chairman, R3-2020
1 Space Park, Redondo Beach, California.
Sponsored by The American Federation
of Information Processing Societies,
and The Information Processing
Society of Japan.



360/50 H (256K)

**SHORT TERM LEASE
OR SALE**

**AVAILABLE
AUGUST 1972**

COMPUTER CLEARING CORP.
P.O. BOX 491
WILTON, CT. 06897
(203) 762-8378

-370-

LEASES AVAILABLE

DPF Plans to Offer Full Range Of Services, Support for 360s

By E. Drake Lundell Jr.
Of the CW Staff

HARTSDALE, N.Y. — It is no longer adequate for a leasing company to offer only financial services to computer users; they must now offer a complete range of services, according to Mike Creedon, vice-president of marketing at DPF Inc.

The leasing companies have to offer the complete line, he said, so the user will have a choice of options when considering computer equipment and will not be dependent on IBM.

To do this, DPF will begin offering independently produced disks, core memory and software support for IBM 360 leasing customers, Creedon said.

DPF plans to put together a consortium of companies instead of acquiring firms in the field, he indicated.

The independents have interests that are similar to the leasing companies, he said, so tie-ups between them are natural.

Single Source

With this type of arrangement the user can look on the leasing company much the same way he does on the mainframe manufacturers, as a source of a full system of CPUs, peripherals and software, he said.

DPF is in a good position to make this type of move because it has just written down its investment in 360 equipment to the tune of \$42 million, according to DPF President Bertram Cohn.

The move "makes us more conservative than practically all others" presently in the leasing business, he added, in the field of accounting.

The adjustment was necessary in order for DPF to fully pay off its 360 investment by 1979, he added, at which time the firm expects the entire inventory to be paid for.

In the near future, Creedon said, DPF will be announcing agreements with firms that manufacture 3330 replacement disk drives, high speed core and other core memory, and expects to offer OS and DOS support for IBM users.

In addition, the firm will offer hardware and software monitoring services to 360 customers to enable them to tell exactly how efficiently their equipment is being utilized.

Many firms feel coerced to go to the 370 from IBM, he said, even though they are not fully using their 360 equipment.

Offering the newer IBM compatible peripherals to present leasing customers will have a moderately bearish effect on the present inventory of peripheral equipment, Creedon admitted, but he said the firm was confident it could release returned peripherals both to new markets here and to the European marketplace.

DPF, he added, will also move cautiously into the 370 leasing marketplace, perhaps by offering packages to a selected number of users in this area.

"You have to cater to the user's needs," he noted, adding that many users want to

be able to upgrade from their 360 equipment to 370s.

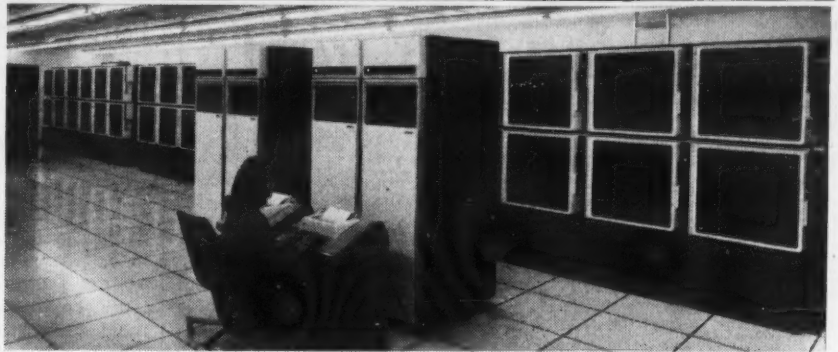
In this regard, Creedon said DPF would accept any System 360 owned by the current user as a trade in or credit to be applied to a larger DPF supplied 360 or 370.

If the present user does not want to sell the 360 outright to DPF, he said the company would offer to remarket on a new lease the user-owned 360.

DPF will also offer a complete service to the customer, including ordering peripheral equipment, arranging maintenance, and other services.

"There are many users, he said, "who know they could get more out of their System 360 but feel trapped into going to the 370 because they are not sure who will support the 360 in the future.

"DPF is dedicated to System 360 and will provide full support services to these customers," he claimed.



Biggie Passes Test

Preshipment acceptance testing of a TBM memory system, developed by Ampex Corp. under a U.S. Government contract, has been successfully completed, according to Dr. William A. Gross, Ampex vice-president, research and advanced technology. It is the first of the presently available trillion-bit memory systems to pass such a milestone, Gross claimed.

Testing by the government simulated computer environment, and all functions including search, read, write, erase, update and tape interchange, were performed singly or simultaneously, in various combinations.

Final phase of the four-week tests consisted of 10 days of continuous (22-hour/day) operation. The TBM memory system uptime during the full testing period was 98.3%, Ampex said.

The TBM memory system is a modular system with a storage capacity ranging from one-tenth of a trillion bits to three trillion bits.

**We have over
500 service specialists
in 72 cities
ready to pounce on your
computer problems.**

You don't have to worry about computers, they usually stay in one place.

But you can't say the same about other parts of today's complex computer networks.

You don't know where a customer is going to want a remote batch processor, a printer, or even a simple terminal.

With our third-party network of service specialists, you don't have to worry about any of them.

Our specialists will do your worrying for you and they'll also do your servicing on any computer equipment, anywhere.

They're used to worrying about other people's problems because they work for an organization that has spent over ten years doing just that. Providing service to all customers of GTE Information Systems, a major supplier of total data communications systems.

What could be a major servicing project for you could be little more than an hour's drive for one of our experts.

And our third-party arrangement can make nationwide servicing a lot easier on your pocketbook.

So, stop worrying about details. Just sit back and enjoy being only the party of the first part.

For a free invitation, call Chuck Olano at 609-235-7300. Or write to him at GTE Information Systems, Service Division, East Park Drive, Mt. Laurel, N.J. 08057.

GTE INFORMATION SYSTEMS

Honeywell to Maintain Other Firms' Products

WALTHAM, Mass. — Honeywell will provide nationwide maintenance and service for four computer industry firms, according to William J. Herbert, manager of business development in the Field Engineering Division.

Honeywell will service Data Devices' tape cleaners and testers, including the new Mark IV tape cleaner, and Rixon modems which transmit data at speeds of from 1,800 to 9,600 bit/sec.

Cambridge Memories Inc. has signed for services on its plug-compatible 360/Core Memory Systems.

The contract with Data Recall Inc., covers add-on core memories and calls for additional staffing by Honeywell and additional training of Honeywell field service engineers.

Data Products Turns Around

WOODLAND HILLS, Calif. — Data Products Corp. managed a sharp turnaround in operations for the year ended March 25, finishing with the strongest quarter of the year.

Revenues from continuing operations improved 16% from \$43.9 million to a record high \$50.9 million. Earnings were \$703,000, compared with a loss of \$10.6 million the year before.

In the fourth consecutive profitable quarter, earnings reached \$215,000 on revenues of \$12.4 million. "It is significant to note that while the year has been one of consolidation of operations, reduction of expenses, and adjustment to marketplace realities, we have achieved record shipments and have continued a strong developmental and marketing effort," said President Graham Tyson.

Acquisitions

System Development Corp. has acquired Mechanics Research Inc. (MRI), a civil and mechanical engineering firm, for cash and warrants. MRI will operate as a wholly owned subsidiary.

Control Data Corp. has agreed

in principle to acquire Syntonic Technology, Inc. for an estimated \$6.9 million worth of Control Data common stock. Syntonic Technology is a computer equipment maintenance firm.

University Computing Co. has sold its Digitizer product line to A.E. Trolie & Associates of Broomall, Pa. UCC Communication Systems Inc., a UCC subsidiary, will continue to provide maintenance on the equipment.

Cybermatics Inc. has acquired Automated Labels and Forms, Inc. for cash and six-year notes aggregating \$425,000.

Eldorado Electrodata has acquired the Nanosecond product line of Zeta Research Corp., Lafayette, Calif.

**370
LEASING
Three Years.
No Strings.**

Computer Finding Corp.
150 East 18th St.
New York, N.Y. 10003
(212) 777-1315

Telex Earnings, Revenues Decline For the Year; Many Factors Cited

TULSA, Okla. — Near the top of Telex Corp.'s list of reasons why revenues and earnings declined for the year ended March 31 was a reduction in sales to independent leasing companies.

Other factors cited were "intense competition," i.e. IBM's fixed term lease plan, and the interim delay between the phase out of Model 5314 disk drives and 4500 tape drives and the introduction of new products, such as its high-speed train printer and model 6400 tape drives.

Revenues for the year sank to \$73.6 million from last year's \$81.5 million. Earnings fell to \$1.3 million or 12 cents a share compared with \$5.5 million or 53 cents a share in the 1971 fiscal period.

User Shipments Decline

The sales value of peripheral equipment delivered to end users during the year was down to \$61.9 million from \$80.9 million last year. About \$32.2 million or 52% of peripheral equipment volume was sold to leasing firms, compared with \$48.1 million or 59% the year before.

Rental revenues invoiced under the operating method of accounting, totaled \$9.7 million compared with \$2.4 million in 1971.

European operations registered a loss of \$899,000 or 9 cents a share, and discontinuance of the Direct Access Storage facility in California showed on the books as an extraordinary charge of \$882,000 or 8 cents a share.

The backlog for products also declined. As of March 31, Telex had firm orders for sale or lease of equipment having a sales value of \$43.1 million compared with \$65.3 million last year.

Intel Shows Loss For 1st Quarter

SAN FRANCISCO — First quarter earnings slumped at Intel Corp. to a loss of \$1.5 million, or 21 cents a share.

In the comparable period a year ago, earnings after discontinued operations were \$2.1 million or 30 cents a share. Revenues declined to \$19.4 million from \$27.7 million in the same period of 1971.

President Peter Redfield, however, is projecting Intel will return to profitability during the fourth quarter.

"Intel's programs in computer products and financial services are proceeding well and on schedule," Redfield said. The Computer Leasing Division has about 99% of its equipment on lease or committed to leases at all times, he noted. The Data Processing Division has increased its client base during the quarter, and "the success of our Computer Products marketing program has far exceeded expectations," according to Redfield.

The Information Storage Systems Division is operating in a loss position, a condition expected to continue until the fourth quarter when deliveries of the new 3330-type disk drive system are expected to begin, Intel said.

Nickels & Dimes

The Honeywell Bull Group reported earnings of \$15.5 million for 1971, on revenues of \$348 million.

\$\$\$

Information Control Corp. (ICC) and IDS Leasing Corp. have concluded a lease financing agreement that will allow ICC to increase the volume of equipment leased.

\$\$\$

Digital Computer Controls' sales for the year ended Feb. 29 rose five-fold, to \$3.3 million, while earnings soared from a loss of \$178,756 to a tidy profit of \$516,984. The firm expects first quarter figures to dip below those of recent quarters, but with growth resuming in the second quarter.

\$\$\$

Name game: United Utilities is now known as United Telecommunications.

\$\$\$

Cash Hungry: I/O Devices is "exploring all appropriate means including debt financing, equity financing, merger or other financial arrangements in order to relieve a current working capital shortage." The firm has back orders for 274 of its Model 100 printers, but needs capital to produce them.

\$\$\$

Raytheon's first quarter ended April 2 set records for the highest sales and earnings in any quarter.

\$\$\$

A penny here ... Burroughs' quarterly dividend will be 16 cents a share payable on July 20 to stockholders of record June 23. The previous rate was 15 cents a share.

Buy now... save later!

After four years of stable prices with increased costs... and a continually improved product, *EDP Industry Report* — the computer industry's executive newsletter — has announced a price increase, effective July 1, 1972, to \$95 per year.

But there's good news connected with the announcement. Between now and the end of June, new subscriptions will be accepted at old rates, as shown below.

Go ahead! If you've been meaning to subscribe, now is the time. One issue alone can be worth the price... the rest is gravy.

GENTLEMEN: Yes, I want to take advantage of a subscription to *EDP Industry Report* before the price goes up. Please enter my subscription according to the instructions I have checked below:

- | | |
|---|--|
| <input type="checkbox"/> Six months for \$40.00 | <input type="checkbox"/> My check is enclosed |
| <input type="checkbox"/> One year for \$75.00 | <input type="checkbox"/> Bill me |
| <input type="checkbox"/> Two years for \$135.00 | <input type="checkbox"/> Bill my company |
| <input type="checkbox"/> Three years for \$185.00 | <input type="checkbox"/> Purchase order enclosed |

Signature _____

Name _____

Title _____

Organization _____

Address _____

City & State _____ Zip _____

Earnings Reports

SPERRY RAND

Year Ended March 31

	1972 (000)	1971 (000)
Shr Ernd	\$1.77	\$2.11
Revenue	1,823,937	1,739,381
Earnings	660,780	72,266
3 Mo Shr	.69	.60
Revenue	549,791	468,024
Earnings	23,827	20,683

a-After providing in the fourth quarter for nonrecurring costs of approximately \$14 million related to plant closings and discontinued product lines. b-Change in accounting method for investments in 20% to 50%-owned companies resulted in earnings increase of \$5.2 million.

COMPUTER INSTRUMENTS

Four Months Ended April 21

	1972	1971
Revenue	\$1,382,724	\$1,348,746
Earnings	52,186	(22,608)

ROCKWOOD COMPUTER

Year Ended March 31

	1972	1971
Shr Ernd	\$.57	.....
Revenue	51,807,902	45,804,987
Spec Item	a16,525	b6,857,797
Earnings	1,996,917	(5,113,803)

a-Credit; gain on repurchase of debentures and tax loss carryforward. b-Debit; loss from discontinued operations and sale of subsidiary companies and other assets less gain on repurchase of debentures.

PLANNING RESEARCH

Three Months Ended March 31

	1972	a1971
Shr Ernd	\$.16	\$.14
Revenue	b19,662,247	14,910,316
Earnings	998,571	812,020
9 Mo Shr	.45	.45
Revenue	b55,857,004	45,276,949
Earnings	2,785,861	2,547,863

a-Restated to reflect discontinued operations and acquisitions on a pooling-of-interests basis. b-Includes reve-

nues of \$697,101 in the quarter and \$2,011,000 in the nine months from International Reservations Corp.

OPTICAL SCANNING

Three Months Ended March 31

	1972	a1971
Revenue	\$2,843,609	\$2,151,151
Loss	450,116	1,018,139
9 Mo Rev	7,353,687	6,217,888
Spec Chg	.....	d8,477,639
Loss	1,666,132	11,308,886

a-Restated to reflect change in accounting method for equipment sold to third-party lessors. d-Cumulative effect of changes in accounting principles.

BOLT BERANEK AND NEWMAN

Three Months Ended March 31

	1972	1971
Shr Ernd	\$.17	\$.04
Revenue	4,639,400	4,180,900
Loss Disc	.....	67,100
Op	.....	67,100
Earnings	206,800	48,400
9 Mo Shr	.47	.14
Revenue	13,764,500	12,255,700
Loss Disc	.....	277,600
Op	.....	277,600
Earnings	567,600	173,100

AGS COMPUTERS

Three Months Ended March 31

	1972	1971
Shr Ernd	\$.06	.....
Revenue	299,698	237,902
Loss Disc	.....	.....
Op	.....	8,076
Earnings	27,762	288

TRACOR COMPUTING

Three Months Ended March 31

	1972	a1971
Shr Ernd	\$.02	.....
Revenue	2,224,000	\$1,728,000
Disc Op	(6,000)	2,000
Tax Cred	47,000	4,000
Earnings	111,000	20,000

a-Restated.

**EDP industry
report**

60 Austin St. Newton, Mass. 02160



TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics
compiled, computed
and formatted by
TRADE*QUOTES, INC.
Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, JUNE 15, 1972

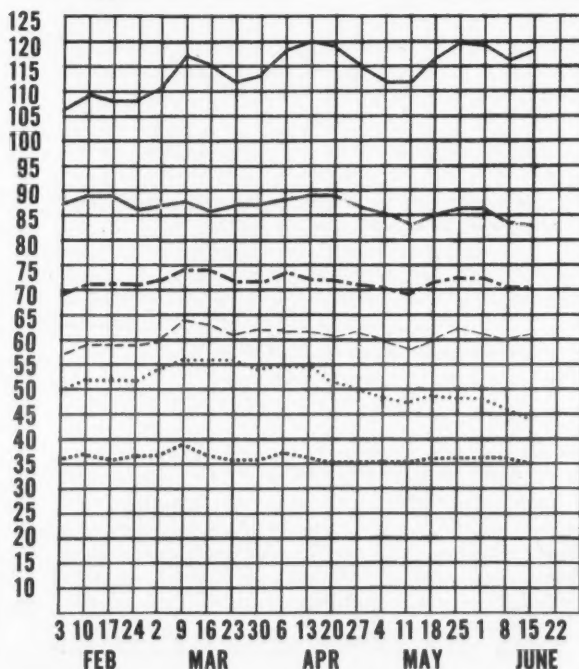
E X C H	1972 RANGE (1)	CLOSE JUN 15 1972	WEEK NET CHNGE	WEEK PCT CHNGE
SOFTWARE & EDP SERVICES				
O ADVANCED COMP TECH	1- 2	1 3/8	+ 1/8	+10.0
A APPLIED DATA RES.	5- 7	4 1/2	0	0.0
O APPLIED LOGIC	1- 4	2 3/4	- 1/8	-4.3
N AUTOMATIC DATA PROC	72- 91	90 5/8	+3 7/8	+4.4
O AUTO SCIENCES	1- 1	1/8	0	0.0
O COMPUTER DIMENSIONS	0- 14	10 1/2	0	0.0
O COMPUTER NETWORK	4- 7	5 1/4	- 1/8	-2.3
N COMPUTER SCIENCES	7- 10	7	- 1/2	-6.6
O COMPUTER TECHNOLOGY	6- 8	5 1/2	0	0.0
O COMPUTER USAGE	9- 14	10 3/4	+ 3/4	+7.5
O COMP AUTOMOT REPORTS	5- 9	5 3/4	- 1/4	-4.1
N COMPUTING & SOFTWARE	19- 28	19	- 3/4	-3.7
O COMRESS	1- 3	1 3/4	+ 1/8	+7.6
O COMSHARE	5- 10	7 7/8	+ 3/8	+5.0
O DATA AUTOMATION	1- 1	1/4	0	0.0
O DATAMATION SERVICE	1- 1	1	+ 1/8	+14.2
O DATATAB	5- 9	5 1/2	- 1/2	-8.3
O EDP RESOURCES	4- 8	4	- 1/4	-5.8
A ELECT COMP PROG	3- 5	2 7/8	0	0.0
N ELECTRONIC DATA SYS.	43- 65	61	+ 1/4	+0.4
O INFORMATICS	8- 11	8 1/8	- 1/2	-5.7
O I.O.A. DATA CORP	1- 2	2 3/4	0	0.0
A ITEL	9- 12	9	0	0.0
O KEANE ASSOCIATES	4- 7	4 1/4	- 1/4	-5.5
O KEYDATA CORP	7- 11	14 3/4	+ 3/8	+2.6
O LOGICON	4- 9	7 1/8	- 1/8	-1.7
A MANAGEMENT DATA	6- 10	8 1/4	+ 3/8	+4.7
O NATIONAL CSS INC	8- 24	23 3/4	+3 1/2	+17.2
O NAT COMP ANALYSTS	1- 1	1	+ 1/4	+33.3
P ON LINE SYSTEMS INC	8- 16	16 1/4	+ 3/8	+2.3
N PLANNING RESEARCH	11- 17	12 1/4	+ 1/2	+4.2
O PROGRAMMING METHODS	22- 24	21 3/4	-1	-4.3
O PROGRAMMING & SYS	1- 2	1 1/8	+ 1/8	+12.5
O SCIENTIFIC COMPUTERS	3- 4	2 7/8	+ 1/8	+4.5
O SIMPLICITY COMPUTER	1- 5	3 7/8	0	0.0
O SOFTWARE SYSTEMS	1- 3	1 3/8	0	0.0
O TBS COMPUTER CENTERS	4- 6	5 7/8	0	0.0
O TRACOR COMPUTING	2- 3	1 7/8	- 1/8	-6.2
O TYMSHARE INC	7- 10	9 1/8	+ 1/8	+1.3
O UNITED DATA CENTER	5- 8	7	0	0.0
N UNIVERSITY COMPUTING	19- 26	20	- 3/8	-1.8
A URS SYSTEMS	6- 10	8 5/8	+ 1/8	+1.4
O VORTEX CORP	4- 5	2 1/2	0	0.0
PERIPHERALS & SUBSYSTEMS				
N ADDRESSOGRAPH-MULT	34- 44	41 1/8	- 1/8	-0.3
O ALPHANUMERIC	1- 2	3/8	- 1/8	-25.0
N AMPEX CORP	7- 15	7 3/8	- 1/8	-1.6
O ANDERSON JACOBSON	5- 8	5 1/8	- 1/8	-2.3
O ATLANTIC TECHNOLOGY	3- 11	9	+ 1/4	+2.8
A BOLT, BERANEK & NEW	5- 18	15 5/8	0	0.0
N BUNKER-RAMO	9- 14	11 3/4	+ 1/8	+1.0
A CALCOMP	17- 25	17	- 3/8	-2.1
O CENTRONICS DATA COMP	11- 53	51 1/2	-1	-1.9
O COGNITRONICS	3- 5	3	- 1/4	-7.6
O COMPUTER COMMUN.	3- 7	3 1/8	0	0.0
A COMPUTER EQUIPMENT	3- 4	3 1/8	- 1/4	-7.4
O COMPUTER MACHINERY	7- 13	9 7/8	0	0.0
A COMPUTEST	5- 9	5	- 1/8	-2.4
O CONSOL COMPUTER LTD.	1- 1	3/8	0	0.0
A DATA PRODUCTS CORP	5- 7	4 5/8	- 1/4	-5.1
O DATA RECOGNITION	3- 5	3 1/4	- 1/4	-7.1
O DATA TECHNOLOGY	3- 5	3	- 1/8	-4.0
O DI/AN CONTROLS	0- 8	6 1/8	- 1/4	-3.9
O DIGITRONICS	2- 4	2 1/4	+ 1/4	+12.5
N ELECTRONIC M & M	5- 8	5 7/8	+ 1/8	+2.1
O FABRI-TEK	2- 5	3 5/8	+ 1/8	+3.5
O GENERAL COMPUTER SYS	7- 16	13	- 1/2	-3.7
N GENERAL ELECTRIC	59- 70	66 5/8	0	0.0
N HAZELTINE CORP	9- 13	11 1/4	0	0.0
O INFOTEC INC	28- 47	41 1/2	+1	+2.4
O INFORMATION DISPLAYS	3- 5	2 1/2	0	0.0
O MANAGEMENT ASSIST	1- 2	3/4	0	0.0
N MEMOREX	27- 38	28 5/8	- 5/8	-2.1
A MILGO ELECTRONICS	17- 44	38 1/2	+ 1/4	+0.6
N MOHAWK DATA SCI	20- 27	21 1/8	-1 1/8	-5.0
O OPTICAL SCANNING	7- 16	12	0	0.0
O PERTEC CORP	9- 17	10	- 1/4	-2.4
O PHOTON	7- 15	12 5/8	- 1/8	-0.9
A POTTER INSTRUMENT	14- 21	13 1/2	- 3/4	-5.2
O PRECISION INST.	7- 13	9	0	0.0
N RECOGNITION EQUIP	9- 15	8 1/2	- 3/4	-8.1
N SANDERS ASSOCIATES	14- 21	14 5/8	+ 1/4	+1.7
O SCAN DATA	9- 13	8 3/4	- 1/4	-2.7
O STORAGE TECHNOLOGY	17- 39	37 1/2	+2 1/8	+6.0
O SYCOR INC	7- 11	9 1/4	- 3/4	-7.5
O TALLY CORP.	8- 15	13 7/8	+1 1/2	+12.1
N TEKTRONIX INC	34- 57	55	+2	+3.7
N TELEX	9- 15	9 1/4	- 3/4	-7.5
SUPPLIES & ACCESSORIES				
O BALTIMORE BUS FORMS	6- 9	6 1/2	- 1/4	-3.7
A BARRY WRIGHT	9- 13	11 1/4	+ 1/4	+2.2
A DATA DOCUMENTS	17- 26	21 5/8	- 1/8	-0.5
O DUPLEX PRODUCTS INC	9- 16	10	+ 1/2	+5.2
N ENNIS BUS. FORMS	7- 10	9 1/8	+ 3/8	+4.2
O GRAHAM MAGNETICS	15- 27	19 3/4	- 5/8	-3.0
O GRAPHIC CONTROLS	12- 15	13	- 3/4	-5.4
N 3M COMPANY	129-158	154	+4	+2.6
O MOORE BUS. FORMS	42- 55	53 3/8	+ 1/8	+0.2
N NASHUA CORP	48- 56	54 1/2	- 5/8	-1.1

E X C H	1972 RANGE (1)	CLOSE JUN 15 1972	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS				
O REYNOLDS & REYNOLD	37- 77	39 1/4	-1 3/4	-4.2
O STANDARD REGISTER	16- 20	16 1/4	-1 1/4	-7.1
O TAB PRODUCTS CO	14- 17	13 1/2	-1	-6.8
N UARCO	23- 28	23 7/8	+ 1/2	+2.1
A WABASH MAGNETICS	8- 11	9 3/8	+ 1/4	+2.7
N WALLACE BUS FORMS	22- 26	23 1/2	- 1/8	-0.5
N BURROUGHS CORP	147-189	185 3/4	+5 1/4	+2.9
N COLLINS RADIO	14- 20	14 5/8	- 1/2	-3.3
N CONTROL DATA CORP	43- 74	72 1/2	+3 5/8	+5.2
O DATA GENERAL CORP	56- 99	94 1/2	+ 1/2	+0.5
O DIGITAL COMP CONTROL	10- 25	12 1/4	+2 7/8	+30.6
N DIGITAL EQUIPMENT	72- 97	86 1/2	+1 3/4	+2.0
N ELECTRONIC ASSOC.	6- 13	11 1/4	+ 1/8	+1.1
A ELECTRONIC ENGINEER.	8- 14	8 5/8	- 3/8	-4.1
N FOXBORO	34- 41	39 1/8	- 5/8	-1.5
O GENERAL AUTOMATION	13- 26	23	+1	+4.5
N HEWLETT-PACKARD CO	46- 72	71 5/8	+4 1/4	+6.3
N HONEYWELL INC	130-158	153 5/8	+3 3/8	+2.2
N IBM	333-404	397 1/2	+4 3/4	+1.2
O INTERDATA INC	8- 16	10 1/4	- 3/4	-6.8
O MICRODATA CORP	5- 10	9 1/4	- 1/2	-5.1
N NCR	29- 35	33 1/4	+ 7/8	+2.7
N RAYTHEON CO	37- 47	37 1/8	- 3/4	-1.9
N SPERRY RAND	30- 41	39	+ 3/4	+1.9
A SYSTEMS ENG. LABS	11- 16	13 1/8	+ 1/2	+3.9
N VARIAN ASSOCIATES	14- 18	15	0	0.0
N VICTOR COMPTOMETER	15- 24	20 1/4	+ 1/4	+1.2
N WANG LABS.	35- 60	56 1/4	+2	+3.6
N XEROX CORP	121-159	153	+2 1/4	+1.4
LEASING COMPANIES				
A BOOTHE COMPUTER	8- 18	7 7/8	- 1/4	-3.0
O BRESNAHAN COMP.	2- 3	2 1/4	0	0.0
O COMDISCO INC	3- 11	10 1/2	+ 1/4	+2.4
O COMPUTER EXCHANGE	2- 3	2	- 5/8	-23.8
A COMPUTER INVSTRS GRP	8- 14	9 7/8	- 1/4	-2.4
N DPF INC	6- 13	6 5/8	+ 1/8	+1.9
M DATRONIC RENTAL	3- 4	2 3/4	0	0.0
A DCL INC	5- 10	5 3/8	- 1/2	-8.5
A DEARBORN-STORM	18- 26	21	+ 3/4	+3.7
A DPA, INC.	5- 8	6	- 1/8	-2.0
A GRANITE MGT	7- 11	7 1/8	- 5/8	-8.0
A GREYHOUND COMPUTER	7- 11	7 3/8	+ 1/8	+1.7
N LEASCO CORP	18- 24	19 1/4	+ 3/8	+1.9
O LECTRO MGT INC	2- 4	1 3/8	- 1/2	-26.6
O NCC INDUSTRIES	8- 11	8 1/8	+ 3/8	+4.8
A ROCKWOOD COMPUTER	4- 7	3 3/4	- 1/8	-3.2
O SYSTEMS CAPITAL	3- 14	13 3/4	0	0.0
N U.S. LEASING	36- 49	46 1/4	- 1/2	-1.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index

— Computer Systems — Software & EDP Services
..... Peripherals & Subsystems Leasing Companies
— Supplies & Accessories — CW Composite Index



Earnings Reports

UNIVERSITY COMPUTING

Three Months Ended March 31

	1972	a1971
bShr Ernd	\$1.41	\$1.23
aRevenue	30,486,000	34,279,000
Earnings	11,825,000	1,706,000

a-Restated to reflect accounting change. b-On a primary basis. On a fully diluted basis per share earnings were \$1.34 in 1972.

GRAPHIC CONTROLS

Three Months Ended March 31

	1972	1971
Shr Ernd	\$0.33	\$0.16
aRevenue	6,129,246	5,501,053
Loss Disc		
Op		59,000
Earnings	278,886	132,716

a-From continuing operations. b-Adjusted for a 3% stock dividend in January 1972.

COMPUTER HORIZONS

Year Ended Feb. 29

	1972	1971
Shr Ernd	\$0.19	\$0.19
Revenue	1,402,335	1,121,644
Earnings	70,239	73,867

ELECTRONIC DATA

Three Months Ended March 31

	1972	1971
Shr Ernd	\$0.27	\$0.23
Revenue	23,682,020	20,049,005
Earnings	3,238,995	2,782,142
9 Mo Shr	.75	.62
Revenue	65,417,197	55,018,312
Earnings	8,958,577	7,415,371

COMRESS

Three Months Ended March 31

	1972	a1971
Shr Ernd	\$0.02	\$0.02
Revenue	1,651,700	\$1,066,000
Earnings	146,800	(72,900)

a-Restated. b-Includes \$6,000 equity in affiliates.

NATIONAL CSS

Year Ended Feb. 29

	1972	1971
Shr Ernd	\$0.52	\$(1.67)
Revenue	11,109,321	7,789,603
Spec Cred	261,000	.....
Earnings	556,868	(1,737,121)
3 Mo Shr	.17	.08
Revenue	3,175,899	2,380,737
Spec Cred	83,859	.....
Earnings	187,433	87,088

1061 CONTROL UNITS

+ 1062 TERMINALS SALE

For
Available Immediately
Contact

COMDISCO, INC.

2200 E. Devon Ave.
Des Plaines, Ill. 60018
or Call:
(312) 297-3640

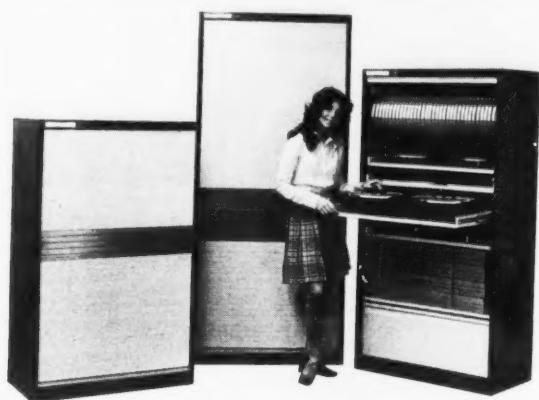
Sierra
monitoring
and control
systems
let your
computer
get its hands
dirty

Research Corporation
Sierra
Data Systems Division
217 Middlesex Turnpike
Burlington, Massachusetts 01803
Telephone (617) 273-0900

Any media storage cabinet you buy now may be obsolete before it is delivered...

before you buy, find out about the improved storage efficiency and cost advantages of new optimedia™ cabinets

Two years ago we decided that it didn't make much sense to keep designing cabinets that were locked-in to the storage of cards only or tape only or one type of disk pack. So we studied the total media storage problem from all angles and came up with what we believe is the ideal solution, optimedia™ coordinated cabinets can store all types and sizes



of data processing media. They can store them in virtually any combination you desire, and — when your storage requirements change, optimedia cabinets can adapt to the changes. They're sort of a "living" storage system that won't become obsolete or leave you with excess capacity for one medium and not enough for another.

optimedia™ coordinated cabinets have other benefits such as "Action Level" storage that lets you place all media at the most convenient retrieval height, smooth operating roll up doors that open all the way leaving the entire inside fully accessible, and up to 20% extra storage capacity when compared to other cabinets with the same outside dimensions.

So . . . hold up that purchase requisition until you can hear the full story on optimedia™ coordinated cabinets. That way you may avoid buying something that's obsolete before it's delivered.

For the complete story on optimedia™ coordinated cabinets, call your local Wright Line office. You'll find it listed in the yellow pages in all major cities or contact us by writing direct or circling the readers' service number. Wright Line, a Division of Barry Wright Corporation, 160 Gold Star Boulevard, Worcester, Massachusetts 01606.

Wright
LINE

MEDIA MANAGEMENT SYSTEMS

